ONOMIC SURVEY OF EUROPE IN 1971

PART 1

E/ECE/814

THE EUROPEAN ECONOMY FROM THE 1950s TO THE 1970s

UNITED NATIONS

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PART I

THE EUROPEAN ECONOMY FROM THE 1950s TO THE 1970s

Prepared by the
SECRETARIAT OF THE
ECONOMIC COMMISSION FOR EUROPE
GENEVA

NEW YORK, 1972

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E/ECE/814

UNITED NATIONS PUBLICATION

Sales number: E.72.II.E.1

Price: $U.S. 3.50

(or equivalent in other currencies)

PREFACE

This study is one of a series of reports prepared by the secretariat of the Economic Commission for Europe and published in the annual *Economic Survey of Europe* and *Economic Bulletin for Europe*. The purpose of these studies is to serve the needs of the Commission and to help in reporting on world economic conditions, a task which the Economic and Social Council of the United Nations has entrusted to the Department of Economic and Social Affairs.

The present study is published as Part I of the *Economic Survey of Europe in 1971*. (Part II, which has already been published, deals with the European economy in 1971.) This text is substantially the same as that which was submitted to the Commission at its twenty-seventh session, held in April 1972, for background information.

This SURVEY is published on the responsibility of the secretariat of the Economic Commission for Europe, and the views expressed in it should not be attributed to the Commission or to its participating governments.

May 1972

EXPLANATORY NOTES

The following symbols have been used throughout this SURVEY:

.. = not available or not pertinent;
— = nil or negligible;
* = estimate by the secretariat of the Economic Commission for Europe.

In referring to combinations of years, the use of an oblique stroke—e.g. 1969/70 signifies a twelve-month period (say from 1 July 1969 to 30 June 1970). The use of a hyphen—e.g. 1968–1970—normally signifies either an average of, or a total for, the full period of calendar years covered (including the end years indicated).

Unless the contrary is stated, the standard unit of weight used throughout is the metric ton. The definition "billion" used throughout is one thousand million. Minor discrepancies in totals and percentages are due to rounding.

References in tables or charts to the OECD (Organisation for Economic Co-operation and Development) refer to the west European members of that organization (i.e. excluding Canada, the United States and Japan) unless otherwise stated.

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INTRODUCTION

To mark the twenty-fifth anniversary of the establishment of the Economic Commission for Europe, the secretariat has produced the present study of economic trends in Europe during the past quarter of a century. It is intended to form a background for a forward-looking evaluation of the opportunities for extending international co-operation in the fields of interest of the Commission. The purpose, however inadequately achieved, is thus to select from the tangle of past events those trends which are significant for the future as well as for the historian. The subjects selected for analysis are those with which the Commission, either through its subsidiary bodies or through the research and other activities of its secretariat, has been especially concerned. Even within these limits, however, many important aspects have been omitted. In particular, little emphasis is placed on the development of institutions or of organizations, or on the modalities of policy; the study concentrates rather on the broad sweep of economic change.

For such an over-all review, it has clearly been necessary to treat the major tendencies in very summary ways. Thus it has been impossible, for the most part, to describe events country by country. For comparative purposes, it has been found convenient as a general rule to draw on data summarizing the average experience of groups of countries related by their economic and social systems or by their general level of economic development. (The composition of the groups most often used is described in the general statistical notes below.)

The study economizes, too, on describing the ways in which the statistics have been derived. It draws heavily on the secretariat's companion volume *The ECE Region in Figures,*[1] where data are provided in much greater detail and with fuller explanations. Nearly all the data used in the present study are official statistics, or estimates based upon them, and problems of comparability and quality of statistics are not discussed at any length. For most of the more complex estimates, reference must also be made to earlier *Economic Surveys* and other ECE research publications.

The operational activities of the ECE have, of course, played a significant part in the developments described here. They are, however, described more fully in another companion report, *The work of the Economic Commission for Europe 1947–1972.*[2]

Statistical note

1. *Grouping of countries*

The groupings most often used are as follows (although other groupings have been used occasionally for special purposes):

Industrial western Europe[a]	*Southern Europe*[a]	*Eastern Europe*[b]
Austria	Cyprus	Albania
Belgium	Greece	Bulgaria
Denmark	Malta	Czechoslovakia
Federal Republic of Germany	Portugal	German Democratic Republic
Finland	Spain	Hungary
France	Turkey	Poland
Iceland	Yugoslavia	Romania
Ireland		Soviet Union
Italy		
Netherlands		
Norway		
Sweden		
Switzerland		
United Kingdom		

[a] The term "western Europe" is used to include both industrial western Europe and southern Europe.

[b] The term "eastern Europe" is used to include the Soviet Union unless otherwise specified.

For several analyses, some countries have however had to be omitted for lack of suitable statistics. Thus it has frequently been impossible to include data for Albania, Iceland, Cyprus and Malta in detailed analyses.

2. *Statistical classifications*

In general, data for west European countries have been organized wherever possible in accordance with the United Nations standard systems: in particular the System of National Accounts (SNA), the International System of Industrial Classification (ISIC) and the Standard International Trade Classification (SITC). For east European countries, wherever possible the Council of Mutual Economic Assistance classifications have been used. Important adjustments to these systems are described in notes attached to the relevant tables.

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[1] United Nations Sales No.: E.72.II.E/Mim.5.

[2] United Nations Sales No.: E.72.II.E.3.

CHAPTER 1

THE PATTERN OF EXPANSION

(i) Over-all trends and variations

In the last two decades, Europe's share of the world's output of goods and services increased from rather less to rather more than 40 per cent. With its relatively modest population growth (1.1 per cent a year against 2 per cent for the world), Europe's share of world population fell to about one-quarter. The growth rate of Europe's output, in total (5.5 per cent a year) and, even more, per head of population (4.4 per cent), was well above the world average. Per head, output in Europe is by now nearly 2½ times its level in 1950.

	Percentage shares						*Annual compound growth rates*		
	Population		*GDP*[a]		*Industrial production*[a],[b]		*GDP*[a]	*GDP per head*	*Industrial production*[a],[b]
	1950	*1969*	*1950*	*1969*	*1950*	*1969*	*1950–1952 to 1967–1969*		
Europe	31	26	37	41	39	48	5.5	4.4	7.1
United States	8	7	41	35	45	33	3.7	2.2	4.0
Other developed countries[c] . .	6	6	7	10	7	9	7.2	5.6	7.9
Developing countries[d]	55	61	15	14	9	10	4.8	2.3	6.8
World[d]	100	100	100	100	100	100	5.0	3.0	5.9

Sources: For market economies: United Nations, *Yearbooks of National Accounts Statistics;* for centrally planned economies, secretariat estimates.

[a] At 1963 prices.

[b] Mining, manufacturing and public utilities.

[c] Canada, Japan, Australia, New Zealand, and South Africa.

[d] Excluding Asian centrally planned economies.

Rapid growth in the last twenty years followed, however, nearly forty years of only slow economic progress in most of Europe with the exception of the Soviet Union. Although most of the decade of the 1920s was a period of quite rapid advance in output, two wars and the great depression reduced the long-term rate, (1913 to 1950) to well under 1 per cent a year per head of population.[3] This was in strong contrast with the United States, where the economy emerged from both world wars much stronger than before them: in 1950, GDP per head in the United States was about 70 per cent greater than in 1913. But the expansion of GDP per head in the twenty years after 1950 was only half that in Europe.

Post-war expansion in Europe has been faster than in any period of comparable length, and has deeply transformed not only the scale but the pattern of the region's economy. The reasons underlying the "gear-change" from slow to fast growth have been extensively, and controversially, explored. Attention may be called here only to two elements. First, government economic policies have become positive forces for growth and full employment: in the west, by the use of methods of economic management governed by a new approach to the economic functions of government in a market economy and aided in many countries by indicative planning; in the east, by the use of direct planning and control, based upon public ownership and allocation of productive resources, and directed particularly towards the building up of a comprehensive structure of industry in all countries of the area. Secondly, both in eastern and western Europe, the expansion of trade and the application and diffusion of new technologies have promoted, and been stimulated by, the expansion of output and employment.

Demographic growth and economic expansion within Europe

Within Europe, both output and output per head of population grew fastest in eastern Europe and the Soviet Union, and slowest in industrial western Europe; the less industrialized countries in southern Europe—which had the fastest population growth despite large-scale emigration—take an intermediate position:

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[3] I. Svennilson, *Growth and stagnation in the European economy*, ECE, Geneva 1954, p. 57.

	Percentage shares				*Annual compound growth rates*		
	Population		*GDP (1965 prices)*		*Population*	*GDP*	*GDP per head*
	1950	*1969*	*1950*	*1969*	*1950–1952 to 1967–1969*		
Industrial western Europe	41	39	61	52	0.8	4.6	3.8
Southern Europe	13	14	8	8	1.4	5.9	4.4
Eastern Europe	46	47	31	40	1.3	7.0	5.6
Total Europe	100	100	100	100	1.1	5.5	4.4

Source: Tables 1.1 and 1.3.

Within each of the three groups, too, there were large differences between countries. The biggest increase in population (about 50 per cent over the last twenty years or over 2.5 per cent a year) was in Turkey while in the rest of southern Europe the increase was less than 1 per cent a year. Population growth in the Soviet Union, at 1.5 per cent a year, was faster than elsewhere in eastern Europe. In the industrial west, the Netherlands showed the strongest natural increase but Switzerland (because of immigration) the fastest growth of total population.

For Europe as a whole, the natural increase of population (the excess of births over deaths per 1,000 of population) has tended to fall (table 1.1). This was due mainly to the systematic decline in eastern Europe from the high rates of population growth of the later 1950s; but in all areas a downward trend is evident after the mid-1960s. Crude death rates changed little, but age-specific mortality rates tended to decline everywhere, especially in low income countries, and particularly impressive reductions in infant mortality are general. The associated ageing of the populations has tended to stabilize crude death-rates, and differences in age structure explain much of the mortality differences.

The main determinant of population growth rates has thus been changes in fertility levels. In most of eastern Europe, crude birth rates reached a peak in the 1950s and by the late 1960s the annual numbers of births were around one-third or a quarter below the peak levels. This decline will have important effects on the supply of young labour in the 1970s and 1980s.[4] A similar, but smaller and later, impact is likely to be felt in some west European countries where crude birth rates have tended to fall in the late 1960s. One outcome is the similarity of crude birth rates at present between industrial western countries and eastern Europe, at about 16–17 per 1,000 population. But substantially higher rates are seen in southern Europe.

The decline in fertility levels, accompanied by the rising life expectancy, has for some time been raising the proportion of old people in most of Europe—a trend which is likely to continue in future with all its economic and social implications.

Narrowing the income gap

Faster rates of output growth in the poorer countries, associated with general industrialization, have on balance done something to narrow the wide disparities in *relative* incomes, and output, per head of population between the countries of Europe; the dispersions of national GDP per head, expressed as percentages of a European average or an average for one of the three groupings used here, have mostly narrowed.[5] But the growth rates in the poorer countries have not been fast enough to prevent a widening of the dispersion in terms of the *absolute* differences, expressed in dollars, between countries. Both concepts have their significance. The changes in dispersion are summarized below.

Spread of GDP levels per head of population among countries and country groups

	Absolute dispersion[a]		*Relative dispersion*[a]	
	1950–1952	*1967–1969*	*1950–1952*	*1967–1969*
	(dollars)		*(percentages)*	
Between all individual European countries	360	556	57.0	46.0
Between industrial western countries	276	411	30.6	25.6
Between eastern countries	118	235	28.1	23.4
Between southern countries	44	145	20.1	30.9
Between industrial western, southern and eastern Europe[b]	256	435	51.2	41.9
Between industrial western and eastern Europe[b]	225	283	36.0	21.8
Between southern and industrial western Europe[b]	301	532	54.8	50.7
Between southern and eastern Europe[b]	76	249	23.5	32.5

[a] *Absolute* spread of income levels between countries and regions in each period has been measured by the standard deviation of income levels expressed in dollars at constant prices. *Relative* spread has been measured by the coefficient of variation between the same figures.

[b] i.e. between group averages.

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[4] "Determinants of labour supply in Europe, 1950–1980", *Economic Survey of Europe in 1968*, chap. III.

[5] Comparisons of real income or output between countries, especially between countries with very different patterns of output and expenditure and different price structures, are notoriously unsatisfactory. The figures of GDP per head used here and at various points in the present study are to be taken only as rough indicators, based on a particular method of comparison (in fact, the summation in dollars per head of output or consumption of specified commodities and services measured in physical units). The methods are those used in the estimates for 1965 (extrapolated to other years by the normal national accounting statistics) given in "International comparisons of real income, capital formation and consumption", *Economic Survey of Europe in 1969*, part I, chap. 4. The same SURVEY explores the extent to which a systematic relationship holds between output growth and the initial level of income per head (see especially chapters 2.1 and 3.2).

TABLE 1.1

Rates of natural increase, crude birth rates and death rates in Europe, 1950–1970, by regions

(Average annual rates per 1,000 inhabitants)

	Europe	*Industrial western Europe*	*Southern Europe*[a]	*Eastern Europe and the Soviet Union*[b]	*Eastern Europe excluding the Soviet Union*[b]	*Soviet Union*
Rates of natural increases						
1950–1955	12.1	8.1	16.6	15.5	12.5	17.0
1955–1960	11.5	8.3	16.7	15.6	11.7	17.6
1960–1965	11.5	8.8	17.0	13.0	8.5	15.2
Late 1960s[c]	8.1	5.2	15.1	8.2	7.1	8.9
Crude birth rates						
1950–1955	22.8	18.9	28.7	25.6	23.9	26.4
1955–1960	21.8	18.7	28.2	24.1	21.7	25.3
1960–1965	21.0	19.1	28.2	20.9	17.9	22.4
Late 1960s[c]	18.1	16.3	26.4	17.1	17.4	17.0
Crude death rates						
1950–1955	10.7	10.8	12.1	10.1	11.4	9.4
1955–1960	10.3	10.4	11.5	8.5	10.0	7.7
1960–1965	9.5	10.3	11.2	7.9	9.4	7.2
Late 1960s[c]	10.0	11.1	11.3	8.9	10.3	8.1

Source: See *The ECE Region in Figures*, table 2.

[a] Including Cyprus and Malta. [b] Including Albania. [c] For most countries, 1969 or 1970 figures.

The narrowing of the relative spread is by no means universal. The relative gap between industrial western Europe and eastern Europe has clearly been much reduced. But among the western countries the wide spread of growth rates of total GDP—from 2.5 to 3 per cent a year in the United Kingdom and Ireland to 6 per cent in the Federal Republic of Germany—has narrowed the relative dispersion only slightly. In eastern Europe, the Soviet Union's growth rate was fastest—at 7.5 per cent a year the fastest of any European country—but slowed down in the 1960s. The fastest growth rates were achieved (apart from the Soviet Union) in Bulgaria and Romania, the two least advanced members of the group where the thrust of planned industrialization was strongest.[6] In eastern Europe as a group, with an initial level of output per head not very different from that in southern Europe, output has expanded faster; in southern Europe, however, growth accelerated in the 1960s to an annual rate similar to that in eastern Europe, but the rates of growth among the southern countries has become more uneven (particularly because of relatively low growth of output per head in Turkey).

Variations in growth rates

It is difficult to detect changes in the underlying trend of output growth in the countries of *industrial western Europe* over the last two decades (see table 1.2). A rather clear slowing down between the 1950s and the 1960s is evident in Austria and the Federal Republic of Germany—the fastest growing economies in the 1950s—associated with a falling rate of expansion of the labour force. In other countries, notably Belgium, Denmark, France, Ireland and Norway, there are clear indications of an acceleration;[7] these are countries which expanded more slowly than average in the 1950s. There has thus been a certain convergence of growth rates of GDP towards the average of about 4.5 per cent for industrial western Europe as a whole.

New techniques for managing market economies have neither eliminated the causes of short period fluctuations, nor provided an effective means of counter-cyclical action, to the extent originally hoped. It is more encouraging to note that the faster long-term tempo of growth has meant that "recessions" have rarely, in any country in industrial western Europe, led to an actual decline in output in any year.

Very broadly, and with several departures in individual economies from the average experience, post-war development in *industrial western Europe* can be divided into four

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[6] Based on comparison of three-year averages in table 1.3. Taking the growth between the single years 1950 and 1967, Romania grew faster than the Soviet Union (*Economic Survey of Europe in 1969*, part I, table 2.3).

[7] Statistical tests of acceleration or deceleration over short periods are delicate and uncertain. Tests applied by the OECD for the period *1955–1968* suggest the same results as those above except for France (showing a deceleration, but only in 1959–1968) and Ireland (no significant result), *The Growth of Output 1960–1980*, OECD, Paris 1970, appendix IV.

TABLE 1.2

Europe and United States: total economy output, employment and labour productivity

(Annual percentage compound rates of growth)

Country	*Output (GDP at 1963 f.c.)*			*Employment*			*Output per person employed*		
	1950–1952 to 1967–1969	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*	*1950–1952 to 1967–1969*	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*	*1950–1952 to 1967–1969*	*1950–1952 to 1958–1960*	*1958–196 to 1967–196*
Austria	5.0	5.7	4.5	0.1	0.4	−0.2	5.0	5.3	4.7
Belgium	3.5	2.5	4.5	0.4	0.2	0.6	3.1	2.4	3.8
Denmark	4.0	3.2	4.7	1.1	1.0	1.2	2.8	2.2	3.4
Federal Republic of Germany	6.2	7.5	5.1	1.2	2.2	0.3	5.0	5.2	4.8
Finland	4.4	4.3	4.6	0.9	1.0	0.9	3.5	3.3	3.7
France	5.0	4.3	5.5	0.4	0.0	0.7	4.6	4.4	4.8
Ireland	2.5	0.8	4.0	−0.7	−1.6	0.1	3.2	2.5	3.9
Italy	5.4	5.3	5.5	0.4	0.7	0.2	5.0	4.6	5.3
Netherlands	5.0	4.5	5.5	1.1	1.1	1.2	3.9	3.4	4.3
Norway	4.1	3.0	4.9	0.3	0.0	0.6	3.7	3.1	4.3
Sweden	4.1	3.6	4.5	0.3	0.2	0.4	3.8	3.4	4.1
Switzerland	4.2	4.0	4.4	1.6	1.4	1.8	2.5	2.6	2.5
United Kingdom	2.7	2.4	2.9	0.5	0.5	0.4	2.2	1.8	2.5
Industrial western Europe	4.6	4.5	4.7	0.6	0.8	0.5	3.9	3.6	4.2
Greece	6.0	5.6	6.3	0.9	0.9	1.0	5.0	4.7	5.3
Portugal	5.1	4.0	6.1	0.2	0.4	0.0	4.9	3.6	6.2
Spain	6.1	5.2	7.0	0.8	1.0	0.6	5.3	4.1	6.4
Turkey	5.2	5.1	5.2	..	..	..	..	..	..
Yugoslavia	6.2	6.4	6.1	0.8	0.5	1.1	5.4	5.9	5.0
Southern Europe	5.9	5.3	6.3	..	..	..	..	..	..
Southern Europe ex. Turkey	6.0	5.4	6.6	0.7	0.8	0.7	5.2	4.6	5.8
Bulgaria	6.9	6.4	7.4	0.5	0.7	0.4	6.4	5.7	7.0
Czechoslovakia	5.2	5.7	4.8	1.2	1.0	1.3	4.0	4.7	3.5
German Democratic Republic	5.7	7.1	4.5	0.4	0.7	0.1	5.3	6.4	4.4
Hungary	4.8	4.1	5.5	1.0	1.2	0.7	3.8	2.9	4.8
Poland	6.1	6.2	6.0	1.8	1.7	1.9	4.2	4.4	4.0
Romania	7.2	6.3	8.0	0.9	1.4	0.4	6.2	4.8	7.6
Soviet Union	7.6	8.3	6.9	2.0	1.9	2.1	5.5	6.3	4.7
Eastern Europe	7.0	7.6	6.5	1.7	1.7	1.7	5.2	5.8	4.7
United States	3.7	2.8	4.6	1.4	0.5	2.1	2.3	2.3	2.4

Sources: For western Europe and United States and employment data for eastern Europe, see *The ECE Region in Figures*, tables 5 and 10, supplemented by secretaria estimates. For GDP and employment in eastern Europe, see table 1.3.

periods or cycles of growth which may be summarized as follows:

	Trough	*Peak*	*Trough*	*Growth rates of output*[a]	
				GDP	*Industry*[b]
Post-war recovery period	—	1950	1952	..	8.5
First cycle	1952	1955	1958	4.5	5.3
Second cycle	1958	1960[c]	1967	4.7	5.4
Third cycle	1967	1969	1971	4.7	5.5

NOTE.—The years indicated as "peaks" and "troughs" refer to the years of fastest or slowest growth. They are not "turning points" as designated in the usual business cycle analysis, since there was no year in which real output actually fell.

[a] Annual compound growth rates from 1948 to 1952, 1952 to 1958, 1958 to 1967 and 1967 to 1971. Totals for industrial western Europe.

[b] Mining, manufacturing and public utilities.

[c] A second peak—smaller than that for 1960—took place in 1964.

From the end of the war until the reaction in 1952 fron the Korean war boom, the major influence was sti reconstruction and recovery from the damage and distortions produced by the war. Output growth was rapid. I was assisted by the crucial role of American aid in th European Recovery Programme, operating in a polic framework oriented towards growth, full employment an economic co-operation. The serious balance-of-payment constraints, and particularly western Europe's dolla gap—which seemed an almost intractable obstacle at th end of the war—could otherwise have delayed recover by several years.[8]

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[8] For a review of the problem in this early post-war period see *Economic Survey of Europe since the War* (E/ECE/157) 1953.

A cycle of expanding output began in 1953, reaching a peak in 1955 and fading away in 1958 (when total GDP in the area rose by only 2 per cent—the smallest increase in any post-war year). This cycle was shared by nearly all the western countries. Two major developments mark the period. First was the effective achievement of general full employment by the end of the 1950s. Even by the middle of the decade, recorded unemployment was still substantial by present standards—between 5 and 10 per cent—in Austria, Belgium, Denmark, the Federal Republic of Germany and Italy, despite the fast growth rates in some of these countries, especially the Federal Republic and Italy. By the end of the decade, unemployment had fallen to very low levels except in Italy. A second major feature was the disappearance of the dollar gap, as the huge post-war deficit of western Europe with the United States fell away.[9]

The years from 1959 to 1966 with peaks in 1960 and 1964 were, in most countries, a long period of rather steady expansion [10] (as in the United States in 1961 to 1966), followed by a fairly general levelling out in 1967, when the over-all growth rate fell to 3 per cent. The expansion was fed by the massive movement of workers from the Mediterranean regions to the industrial areas. Between 1959 and 1965, the net movement of workers from European Mediterranean countries and North Africa to the other European countries was about 5 million.[11] This was the period too, when the creation of the Common Market and EFTA began to take effect. With keener international competition, and trade and capital markets increasingly liberalized, imbalances of national surpluses and deficits were causing problems to several countries, which in turn reacted on domestic expansion policies.

From late 1967 began a new cycle of output expansion culminating in 1969, and followed by slower growth rates in 1970 and 1971. A principal, and not yet fully explained feature of this period is the almost universal pressure of inflationary forces in industrial western Europe (as also, if more mildly, in North America and Japan). The inflation followed the output expansion more quickly than in earlier cycles, persisted for much longer in spite of rising unemployment, and has been much stronger.[12] Far more widely than before, the efforts to moderate inflation, becoming the central preoccupation of government economic programmes, have in many countries inhibited re-expansion policies.

In *southern Europe*, structural change, and, particularly, rapid industrialization, are more significant than the cyclical variations. In Greece, Portugal and Spain, the 1960s saw a marked acceleration (to between 6 and 7 per cent a year) in growth rates of GDP, although not in employment—it was over-all productivity that speeded up (see table 1.2). Yugoslavia maintained a growth rate of over 6 per cent a year through the two decades. The growth rate in Turkey has remained at about 5 per cent a year, or only 2.5 per cent per head of population—among the slowest in Europe.

Development in the south European countries has been accompanied by important changes in economic policies. Greece, Portugal, Spain and Turkey all introduced comprehensive medium-term plans in the 1960s. At the same time, the governments aimed at a wider opening of the economies to the European and world markets and reduced the fairly extensive administrative controls, promoting a shift in output and price structures towards those of the industrial market economies. In Yugoslavia, centralized planning had been introduced in 1948. The disruption of links with the other centrally planned economies in 1949 led to an interruption of growth, which was resumed in the early 1950s. A series of decentralization measures and looser controls followed and, especially from the mid-1960s, foreign trade controls and pricing policies have been widely liberalized—not without considerable difficulties of adjustment and inflationary pressure.

While Portugal is the only full member of one of the European economic groupings (EFTA), Greece and Turkey have association agreements with the EEC, Spain has a commercial agreement and Yugoslavia a set of commercial arrangements. At the same time, the influence of fluctuations in the industrial countries is increasingly felt; thus the impact on southern Europe of the 1967 recession in the industrial countries was distinctly more marked than that of the recession of 1958. From a long-term point of view, the integration has been strengthened by emigration from south to north, which by the late 1960s brought emigrants' remittances to southern Europe up to $700 million a year, and net earnings from tourism to about $1.5 billion.

In the *east European countries* as a group, growth of output slowed down somewhat between the 1950s (7.5 per cent a year) and the 1960s (6.5 per cent). This was most evident where the period of recovery from war devastation extended into the 1950s, as in the Soviet Union and the German Democratic Republic, and where the bringing into use and reconstruction of capacity brought high returns in output. Moreover, a certain slowing-down seems to have followed in the industrially advanced countries arising out of the difficulties of transition from extensive to intensive growth. By contrast, the vigorous industrialization programmes in Bulgaria and Romania—largely agricultural economies at the end of the war—brought increasing returns in output growth in the 1960s (see table 1.2).

Apart from these changes in underlying trends, growth tended to proceed in alternating phases of acceleration and slackening. Some fluctuations are unavoidable because of sensitivity to weather and crop fluctuations. It should also be recognized that swings in the growth rate are, at least in part, foreseen and embodied in the central plans, whose emphasis is bound to change over time. But variations in the medium-term growth rates may also be unavoidable because of underlying forces in the growth process, particularly in the investment field. A rather similar pattern of wave-like movements can thus be seen in the different countries of the area.[13]

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[9] See chap. 2 (iii).

[10] Interrupted, however, by short periods of restrained growth, for instance in Italy in 1963–1964, and the United Kingdom in 1962.

[11] See *Economic Survey of Europe in 1966*, chap. 2.

[12] See *Economic Survey of Europe in 1970*, part II, chap. 1, sect. 3.

The post-war reconstruction period was one of fast growth, especially of investment, culminating around 1952. It was followed by a short phase of adjustment with slower increases in investment. A new expansionary phase began in the mid-1950s, reaching a peak around 1959–1960. The intensive development drive, characterized by rapid growth in the investment ratio, gave way in the early 1960s to slower growth rates of both output and investment. Subsequently a new upward swing, but with expansion more balanced between investment and consumption, ended around 1968. This is necessarily a very broad description of tendencies which varied considerably between countries. The limits of self-sustained expansion are naturally widest in large countries with rich natural resources and elastic supply conditions. Hence rates of expansion were rather smooth in the Soviet Union and Poland, while the swings were more marked in Czechoslovakia and the German Democratic Republic and most pronounced in Bulgaria, Hungary and Romania.

The fluctuations in growth of course differ from those in western Europe not only in timing, but also in nature. Socialist planning in eastern Europe succeeded in creating the material and financial conditions for expansion of production capacity and thus in sustaining a process of continuous development. But it has clearly not been possible to surmount the obstacles to smooth growth imposed by limited supplies and competing claims on resources. Investment-led expansion, in particular, if only because of the time-lags involved, is bound to run into occasional bottlenecks, calling, for example, for concentration on the completion of work in progress, a re-phasing of projects, adjustments in stock accumulation and the balance of payments, and often for a reallocation of resources to consumption.

Phases of development

(Annual percentage growth rates)

	GDP	*Investment*
Total eastern Europe		
Expansion periods		
1950–1952	7.6	15.0
1954–1960	7.6	12.7
1963–1968	7.3	8.6
Adjustment periods		
1952–1954	7.5	9.1
1960–1963	5.2	5.4
Eastern Europe (ex. Soviet Union)		
Expansion periods		
1950–1952	8.0	19.8
1954–1960	6.4	12.1
1963–1968	6.0	9.4
Adjustment periods		
1952–1954	5.6	3.9
1960–1963	4.6	5.2

Planning control over the development process, in spite of a reduction in the amplitude of fluctuations, appears to have been simpler in the earlier stages of development. It has had to face new difficulties in increasingly complex economies. More careful calculations of investment costs and returns now play a much more important role. Pressures for higher pay from a better qualified labour force, and for a wider choice of goods and services from increasingly sophisticated consumers, have had their influence. The need to obtain foreign technology and cost-efficiency by expanding international trade has required greater adaptation to price and quality competition both on eastern and western markets. The drive for fast development as a priority objective is being transformed into a far more sophisticated process. The allocation of resources, and the associated pattern of investment, is now a much more complicated task than in the past.

(ii) Structural change

Expansion normally involves structural change. This term is used here simply to describe the shares of three major sectors—agriculture, industry and the rest of the economy (construction and services)—in total employment, output and investment. (The structural shifts within industry are described in chapter 3.) Three shifts in the structure of the economy are common to most European countries (*a*) a falling share of agriculture in both output and employment, (*b*) a rising share of industry in total output (but not everywhere in total employment) and (*c*) a rising share of the rest of the economy in employment (but not as a rule in output).[14]

In *industrial western Europe*, the changes in the structure of output were not large, by comparison with the other areas. The share of agriculture fell everywhere but not by much in countries where it was already down to 5–10 per cent in the early 1950s (as in Belgium, the Federal Republic of Germany and the United Kingdom). Only in Finland (because of forestry), Ireland and Italy is the current share of agricultural output now significantly above 10 per cent of GDP.[15] Nearly everywhere, industry gained most of the shares of output lost to agriculture, the industrial proportion of output rising to as much as 45 per cent in the Federal Republic of Germany. The service sectors kept in total a rather constant share of output:[16] the share of transport and communications generally fell (largely

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[13] See "A fifteen-year review of investment and output in eastern Europe and the Soviet Union", *Economic Bulletin for Europe*, vol. 18, No. 1, 1966, sect. 3 and also *Economic Survey of Europe in 1969*, part I. chap. 2.2 and chart. 2.3.

[14] For a fuller discussion see "Structural trends and prospects in the European economy", *Economic Survey of Europe in 1969*, part I. For additional statistics of individual countries see *The ECE Region in Figures*, tables 6–9 and 12–15 and table 1.3 of the present study for eastern Europe.

[15] See chapter 4 for more details on agriculture.

[16] For developments in the construction industry, see chap. 3.

Sectoral shares as percentages of total economy

	Industrial western Europe		Southern Europe[d]		Eastern Europe and Soviet Union	
	1950–1952	1967–1969	1950–1952	1967–1969	1950–1952	1967–1969
			Output at 1963 prices			
Agriculture[a]	10.5	7.3	38.0	24.0	26.7	14.2
Industry[b]	34.0	39.1	24.9	37.4	32.0	48.3
Other sectors[c]	55.5	53.6	37.1	38.6	41.3	37.5
			Employment			
Agriculture	21.5	11.3	58.2	42.3	48.9	30.8
Industry	33.1	34.7	16.7	23.3	23.6	29.6
Other sectors	45.4	54.0	25.1	34.4	27.5	39.6
	Gross fixed investment (1963 prices)				*Fixed capital stock*	
Agriculture	7.0	5.2	..	..	13.3	12.2
Industry	37.2	32.0	..	..	21.2	29.7
Dwellings	23.2	23.0	..	..	65.5	58.1
Other sectors	32.6	39.8	..	..		

Source: For western Europe, *The ECE Region in Figures*, tables 6–15; for eastern Europe table 1.3.

NOTE.—The sectoral shares are, of course, affected by the price structure, especially in eastern Europe where the original data are in market prices.

[a] Agriculture, forestry and fishing.

[b] Mining, manufacturing and utilities.

[c] Construction, transport, distribution and other private and public services.

[d] Excluding Turkey.

because of increasing use of private cars); construction, distribution, other private services and public services approximately held their shares, but with wide differences in individual countries.[17]

Because of differences in productivity growth (see text-table on page 11), employment shares moved rather differently. With large increases in labour productivity—larger than in industry or the rest of the economy—agricultural employment shares fell more than output shares. Industry's proportion of employment in industrial western Europe as a whole remained rather constant, increasing substantially only in a few countries which were industrializing rapidly (Ireland, Italy). Nowhere, at the end of the 1960s, was the industrial share of employment much above 40 per cent (Federal Republic of Germany, United Kingdom).[18] Because of the relatively slow rise of productivity in the service sector, its stable output share was associated with a substantial increase in the employment share (from 45 to 54 per cent in industrial western Europe). This increase occurred everywhere, although it was small where the agricultural share was already relatively low in the early 1950s. Broadly speaking, big declines in the agricultural share of employment were associated with an expansion of the service sectors rather than with expansion of the industrial share.[19]

The salient feature of the change in investment patterns in the industrial west is the shift in favour of service sectors at the expense of industry's share; investment in distribution and other private services, which had been restrained in the early post-war years, generally increased. The average proportion of investment in dwellings remained about constant, at just under one-quarter of the total.

Structural change in *southern Europe* has of course been far more intense. The agricultural sector has declined heavily in terms of shares of both output and employment although the employment share was still over 40 per cent at the end of the 1960s (as much as 60 per cent in Yugoslavia, but about one-third in Portugal and Spain). The associated gain in output shares has accrued entirely to industry, but in total employment the shares of both industry and the rest of the economy have risen. Indeed industry's proportion of total output by the end of the period (37 per cent) was approaching that in industrial western Europe.[20] The share in output of the rest of the economy has remained about stable, as in the industrial

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[17] For a fuller analysis see *Economic Survey of Europe in 1969*, part I, chap. 3.3.

[18] Comparison with the United States, where the shares of industry in output and employment are less than in the most highly industrialized countries of western Europe, might suggest that above a certain level of development the weight of industry in the economy may decline; but it must be noted that the share of manufacturing employment has always been lower in the United States.

[19] e.g. France and Sweden, where big falls in the agricultural share of employment were associated with almost corresponding increases in the service sector and little or no rise in the industrial share. It is not true of Ireland or Italy, where both the industrial and service sectors gained in share.

[20] This aggregate for southern Europe excludes Turkey, where the proportion is probably lower. Also the high recorded share of industry in Yugoslavia may reflect a difference in price structures.

TABLE 1.3

Eastern Europe: changes in the sectoral structure of gross domestic product, employment and the fixed capital stock

Percentage distribution
(Total of all sectors=100)

	Gross domestic product			*Employment*			*Fixed capital stock*		
	1950–1952	*1958–1960*	*1967–1969*	*1950–1952*	*1958–1960*	*1967–1969*	*1950–1952*	*1958–1960*	*1967–196*
Bulgaria									
Agriculture	49.0	32.9	20.4	71.5	58.0	39.1	13.4	13.1	14.0
Industry	17.0	33.1	46.3	12.0	20.1	29.6	10.8	19.5	31.9
Services	34.0	34.0	33.3	16.5	21.9	31.3	75.8	67.4	54.1
Czechoslovakia									
Agriculture	23.1	14.2	9.1	36.5	28.3	19.3	7.2	7.8	9.1
Industry	42.4	50.4	53.6	31.4	35.8	38.2	24.3	27.0	30.0
Services	34.5	35.4	37.3	32.1	35.9	42.5	68.5	65.2	60.9
German Democratic Republic									
Agriculture	14.0	9.7	7.7	23.8	18.3	14.7	5.6	6.2	7.9
Industry	40.2	50.5	54.2	40.2	42.3	41.6	25.3	28.9	34.7
Services	45.8	39.8	38.1	35.9	39.4	43.7	69.1	64.9	57.4
Hungary									
Agriculture	23.6	20.1	13.0	47.8	40.6	29.4	11.7	12.3	12.3
Industry	32.1	40.5	52.8	20.6	27.1	33.1	13.4	19.9	25.8
Services	44.3	39.4	34.2	31.6	32.3	37.5	74.9	67.8	61.9
Poland									
Agriculture	31.9	23.4	16.0	55.0	48.0	40.6	18.8	17.6	16.1
Industry	29.6	37.5	45.6	18.4	22.2	25.5	18.3	18.8	24.3
Services	38.5	39.1	38.4	26.6	29.8	33.9	62.9	63.6	59.6
Romania									
Agriculture	46.1	36.8	22.7	73.9	68.4	53.3	18.5	15.3	12.5
Industry	21.4	32.5	49.6	11.7	14.1	20.7	20.9	26.9	36.0
Services	32.5	30.7	27.7	14.4	17.5	26.0	60.6	57.8	51.5
Total of six countries									
Agriculture	27.4	19.7	13.7	51.5	44.6	34.8	12.0	11.8	12.0
Industry	33.5	43.0	50.3	22.4	26.1	30.0	20.8	23.7	29.3
Services	39.1	37.3	36.0	26.1	29.3	35.2	67.2	64.5	58.7
Soviet Union									
Agriculture	26.4	21.7	14.4	47.6	40.4	29.0	15.4	14.0	12.3
Industry	31.1	38.4	47.5	24.2	26.0	29.4	21.9	26.3	30.0
Services	42.5	39.9	38.1	28.2	33.6	41.6	62.7	59.7	57.7
Total of seven countries									
Agriculture	26.7	21.1	14.2	48.9	41.8	30.8	13.3	12.9	12.2
Industry	32.0	39.8	48.3	23.6	26.0	29.6	21.2	25.0	29.7
Services	41.3	39.1	37.5	27.5	32.2	39.6	65.5	62.1	58.1

Sources: GDP: secretariat estimates at 1963 prices based on methods described in ECE: *Economic Survey of Europe in 1969*, part I, chap. 2. They are aggregated by using the estimates described in chapter 4 of the same SURVEY. Employment: *The ECE Region in Figures*, tables 5–9. Capital stock: national statistical year books. Czechoslovakia—1960 prices; German Democratic Republic—pre-1967 prices; Hungary—1959 prices; Poland—1961 prices; Romania—1963 prices; Soviet Union—1955 prices; Bulgaria—current prices.

Sectors: Agriculture includes forestry and fishing; Industry: mining, manufac turing and public utilities; Services: construction; transport and communication trade; other material services; non-material services.

countries but at a much lower level. Again, as in the industrial countries, the construction and service sector has increased its share of total employment, although to a much lower level.

Data on sectoral investment trends in southern Europe are incomplete. But in Spain, and to a lesser extent in Portugal, industry's share grew substantially, associated with the acceleration of industrial output growth in the 1960s. By contrast, in Greece it was the service sector, including shipping, which increased its investment share. In Yugoslavia, a big industrial investment drive was carried through in the 1950s; industry took a lower share in the 1960s while the share of housing and services increased.

Eastern Europe and the *Soviet Union* saw much more conspicuous structural changes than the industrial west, and greater diversity of experience among countries (hence data by countries are shown in table 1.3). Progressive industrialization brought the share of industry in total output from one-third in the early 1950s to almost one-half by the late 1960s. The industrial share of output increased substantially everywhere; but the increasing similarity of the national structures is equally significant. In the early 1950s the shares of industry in total output varied from around 40 per cent in the most industrialized countries, the German Democratic Republic and Czechoslovakia, to only about 20 per cent in Bulgaria and Romania where half of total output then derived from agriculture. By the late 1960s the shares of industry were all within the range 45–55 per cent.[21] The share of output in the service sector generally declined slightly. But everywhere the share of agriculture in total output fell, to less than 10 per cent in the most industrialized economies and to 20–23 per cent in the least industrialized.

The shifts in employment shares were somewhat weaker than those in output. The agricultural employment share fell from nearly a half to under one-third in the whole area, but in the late 1960s was still as high as 50 per cent in Romania and about 40 per cent in Bulgaria and Poland. The share of industry rose moderately, from 24 per cent of employment to 30 per cent (not much less, in the late 1960s, than the average of 35 per cent in industrial western Europe); but the differences between countries, by comparison with those in output, were considerable—from between 20 and 25 per cent in Poland and Romania to around 40 per cent in Czechoslovakia and the German Democratic Republic (very similar shares to those in the most industrialized west European countries). The share of the service sector generally rose more than that of industry. The much higher share of agriculture in total employment in eastern compared with western Europe (31 per cent against 11 per cent) finds its counterpart chiefly in the much lower proportion in the east for the service sector (40 per cent against 54 per cent).

The sectoral growth rates underlying these changes in relative shares are summarized in the following table:

Annual growth rates by sector, 1950–1952 to 1967–1969

	Industrial western Europe	*Southern Europe*[a]	*Eastern Europe and Soviet Union*
		Output (value added at 1963 prices)	
Agriculture	2.3	3.2	3.1
Industry	5.4	8.6	9.6
Other sectors	4.4	5.8	6.4
Total	4.6	6.0	7.0
		Employment	
Agriculture	−3.1	−1.1	−1.0
Industry	0.9	2.6	3.1
Other sectors	1.7	2.7	3.9
Total	0.6	0.7	1.7
		Output per person employed	
Agriculture	5.6	4.3	4.1
Industry	4.5	5.8	6.3
Other sectors	2.7	3.0	2.4
Total	4.0	5.3	5.2

Source: For western Europe, *The ECE Region in Figures*, tables 6–15; for eastern Europe, table 1.8.

[a] Excluding Turkey.

Increasing industrialization in eastern Europe was associated with strong productivity gains in industry—6 per cent a year with a 3 per cent annual rise in employment, contrasting with 4.5 and 1 per cent in industrial western Europe. But with a not very fast decline in agricultural employment (1 per cent a year) agricultural productivity in the east (4 per cent) rose much less than in industry; while in the industrial west the stronger fall in agricultural employment (3 per cent) was associated with a faster rise in productivity in agriculture (5.5 per cent) than in industry.

Structural change in several of the east European countries was associated with rapid increases in the labour force. In the area as a whole, employment rose by 1.7 per cent a year, but rates of increase differed considerably. Employment increased by about 2 per cent a year in the Soviet Union and Poland, but by only about half of one per cent a year in Bulgaria and the German Democratic Republic. Differences in the degree of pressure on the labour supply were not met, as in parts of western Europe, by international migration; but they were to some extent offset by changes in activity rates. Thus the declining total population in the German Democratic Republic was offset to a certain extent by greater employment of women; the inelastic labour supply, however, remained a problem. In Poland, by contrast, the fast growth of population in working ages was associated with the continued large share of agriculture in the total labour force.[22]

The direction of investment funds towards industrial expansion was the most powerful instrument for the transformation of the east European economies. This is best seen in terms of the changes in the sectoral composition of the capital stock (table 1.3).[23] The fixed capital stock in industry, in the area as a whole, rising by 8 per cent a year, increasing its share of the total from 21 per cent to 30 per cent; the share of agriculture was slightly reduced and that of services substantially reduced. The increase in the industrial share was universal, but was most marked in Bulgaria (rising from 11 to 32 per cent) and Romania (from 21 to 36 per cent). The outcome (as for industrial output shares) was a certain convergence between countries so that by the end of the 1960s the share of industry varied only between about 25 per cent (in Hungary and Poland) and 35 per cent (German Democratic Republic and Romania).

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[21] The shares of industry in total output are higher in all the east European countries than the highest share in any western country. At least in part, however, this, like other differences in sectoral output shares, may be due to differences in relative price structures. Between eastern and western countries, shares in total employment should be more comparable.

[22] For a fuller discussion of labour force trends, see "Determinants of labour supply in Europe," *Economic Survey of Europe in 1968*, chap. III.

(iii) Labour and capital inputs and productivity [24]

Industrial western Europe

The relative contributions to growth of inputs of labour and of capital, of economies of scale and other factors such as technical progress have been the subject of much research and remain highly controversial. No simple relationship appears to exist. Thus growth rates of output among industrial western countries are not closely correlated with the ratios of fixed investment to GDP (see text-table below), although some relationships can be found.[25] The same absence of close correlation holds when the 1950s and the 1960s are considered separately. In some circumstances—for example in a phase of rapid industrialization or modernization—it is obvious that investment is a necessary (if not sufficient) condition of economic progress. In more mature economies, the sources of growth and progress are far more complex; for one thing, the investment choices are more numerous and the composition of total investment is likely to be less uniform.

	Growth of GDP per cent a year 1950–1952 to 1967–1969	*Investment as per cent of GDP (1950–1969)*	
		Including dwellings	*Excluding dwellings*
Federal Republic of Germany	6.2	27.0	20.2
Italy	5.4	22.1	15.6
Austria	5.0	26.2	21.1
France	5.0	23.7	17.8
Netherlands	5.0	26.0	20.8
Finland	4.4	27.3	21.2
Switzerland	4.2	23.9	18.3
Norway	4.1	32.0	26.7
Sweden	4.1	24.4	18.4
Denmark	4.0	21.0	17.1
Belgium	3.5	22.4	16.2
United Kingdom	2.7	17.5	14.0
Ireland	2.5	21.9[a]	18.2[a]

Source: tables 1.2 and 1.5.

[a] 1960–1969 only.

In industrial western Europe as a whole, output expanded at about the same rate in the 1960s as in the 1950s, but employment increases slowed down and productivity gains somewhat accelerated. The same contrasting movement between employment and productivity gains applies still more strongly to manufacturing industry alone. The ratio of fixed investment to GDP also increased between the two decades. The relationships, however, were such that the over-all Incremental Capital Output Ratio (ICOR),[26] on balance increased, implying a reduced return to investment in terms of output increases. So far as this goes it appears that the output gain per unit of investment declined while gains in labour productivity increased. The ICOR, it must be emphasized, is a way of *describing* investment/output relationships, especially in the absence of comparable statistics of capital stocks, but it cannot display the process of causation.

	Industrial western Europe			
	Whole economy		*Manufacturing only*	
	1950s	*1960s*	*1950s*	*1960s*
1. Investment ratio (excluding dwellings)[a]	15.3	19.2	15.7	18.5
2. Annual growth rate of output[b]	4.5	4.7	5.7	5.6
3. Labour productivity (annual growth rate)[b]	3.6	4.2	4.0	4.9
4. ICOR (ratio of 1 to 2)	3.4	4.1	2.8	3.3

Source: Tables 1.2, 1.4 and 1.5.

[a] Total gross fixed investment 1950–1959 and 1960–1969 as percentage GDP (or added value in manufacturing) over same periods.

[b] 1950–1952 to 1958–1960 and 1958–1960 to 1967–1969.

Between countries, these relationships showed a strong tendency towards convergence over the two decades—not only in output growth (as already noted), but also in rates of growth of employment and labour productivity and in investment ratios—and hence in the output returns on

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[23] For this summary account, changes in capital stock are preferred to the analysis of investment flows (given above for western Europe for which comparable capital stock figures are not available). For statistics of fixed investment flows by sectors in east European countries, see *The ECE Region in Figures*, tables 24–26. They show on the whole a larger (although declining) industrial share of investment than of capital stock. The divergence is due to such factors as the relative proportions at the beginning of the period, differences between sectors in average length of life of capital, etc. Because of differences in relative price structures, comparisons of either stock or flows between east and west would be precarious.

[24] For reasons given in the previous footnote, the analysis for western Europe is based mainly on investment data and for eastern Europe on capital stocks.

[25] One attempt to correlate growth with investment ratios by regression analysis, for OECD countries in 1955–1967, is reported in *The growth of output 1960–1980*, OECD, Paris 1970, appendix VI. The results are admittedly inconclusive, especially for smaller countries.

[26] The accumulated gross fixed investment during a period divided by the gain in output over the period. It is arithmetically equal to the average annual ratio of investment to GDP, divided by the annual compound growth rate of GDP. For a discussion of the significance of the ICOR, see "Some factors in economic growth in Europe during the 1950s", *Economic Survey of Europe in 1961*, part 2, especially chapter II.

TABLE 1.4

Western Europe and United States: manufacturing output, employment and labour productivity

(Annual percentage compound rates of growth)

Country	*Output (value added at 1963 f.c.)*			*Employment*			*Output per person employed*		
	1950–1952 to 1967–1969	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*	*1950–1952 to 1967–1969*	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*	*1950–1952 to 1967–1969*	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*
Austria	5.6	6.7	4.6	0.6	1.6	−0.2	5.0	5.0	4.8
Belgium	5.3	4.0	6.1	0.2	0.0	0.5	5.1	4.0	5,6
Denmark	4.6	3.4	5.7	1.2	1.5	1.0	3.4	1.9	4.7
Federal Republic of Germany	8.0	10.0	6.2	2.1	3.9	0.6	5.8	5.9	5.6
Finland	5.7	4.9	6.3	1.5	1.2	1.8	4.1	3.7	4.4
France	5.8	5.0	6.5	0.5	0.5	0.5	5.3	4.5	6.0
Ireland	4.7	2.6	6.6	1.0	−0.3	2.2	3.7	2.9	4.3
Italy	7.9	7.7	8.0	1.7	1.6	1.7	6.1	6.0	6.2
Netherlands	6.3	5.7	6.9	1.0	1.1	0.8	5.2	4.5	6.1
Norway	4.7	3.6	5.5	0.7	0.1	1.2	4.0	3.5	4.2
Sweden	5.1	3.6	6.6	0.3	0.3	0.3	4.8	3.3	6.3
Switzerland	4.6	4.3	4.8	1.8	2.2	1.4	2.8	2.1	3.4
United Kingdom	3.3	3.1	3.4	0.4	0.8	0.2	2.9	2.3	3.2
Industrial western Europe	5.7	5.7	5.6	1.1	1.6	0.7	4.5	4.0	4.9
Greece	8.1	8.3	7.8	1.5	−0.2	3.1	6.5	8.5	4.6
Portugal	8.6	8.2	8.9	1.9	1.9	1.9	6.6	6.2	6.9
Spain	8.4	6.6	9.5	2.9	3.2	2.6	5.3	3.3	6.7
Yugoslavia	10.4	11.9	9.1	3.6	4.1	3.1	6.6	7.5	5.8
Southern Europe ex. Turkey	8.8	8.3	9.2	2.7	2.8	2.7	5.9	5.3	6.3
United States	3.9	2.1	5.5	1.2	0.2	2.1	2.7	1.9	3.3

Sources and notes: As for table 1.3.

investment (as shown by the ICORs). The most striking differences of the 1950s were much reduced in the 1960s (see tables 1.2, 1.4 and 1.5). The following conclusions emerge from inter-country comparisons.

Employment growth in industrial western Europe as a whole was somewhat slower in the 1960s (0.5 per cent a year) than in the 1950s (0.8 per cent a year), particularly in manufacturing. The most important decline was in the Federal Republic of Germany but significant declines also occurred in Austria (particularly in manufacturing) and Italy. Only in France, Ireland (where employment was falling in the 1950s due to heavy emigration) and Norway was there a substantial acceleration in employment growth. From the late 1950s there was a fairly general movement towards shorter working hours and longer holidays. Total labour input, in terms of total man-hours worked, may well not have increased at all during the 1960s (except in Switzerland, where numbers employed rose faster than anywhere else—by 1.8 per cent a year—wholly as a result of immigration).

Labour productivity growth, both in the total economy and in manufacturing, was faster, in most countries, in the 1960s than in the 1950s (although in some countries the changes were small and might be reversed if different periods were used for comparison). Productivity growth in the whole economy accelerated strongly in Belgium, Denmark, Norway and Sweden; these are countries where total output growth also accelerated fast. The same is true for the manufacturing sector alone in these countries and also in France. Indeed the faster growth of manufacturing output in the 1960s in Denmark, France and Sweden was due wholly to the faster productivity gains. In no country was there any very marked slowing down of productivity increases, either in the total economy or in manufacturing. In Austria and the Federal Republic of Germany output growth was indeed quite substantially reduced with considerable declines in the rate of increase of employment; but productivity gains were relatively well maintained.

Over-all investment ratios rose between the two decades almost everywhere (whether or not dwellings are included), and in manufacturing everywhere but in Italy where the investment ratio was the highest in western Europe in the 1950s. Increases in the manufacturing investment ratio were however rather more modest in accordance with the reduction, noted above, in industry's share of total investment. The net effect of generally higher investment ratios and accompanying a rather stable growth rate of output was that in most countries the ICOR rose, suggesting rather lower output returns to investment (although at the same time, with greater capital intensity per worker, productivity growth rates tended to speed up). The rise in the ICOR was particularly sharp in the Federal Republic of Germany. Only in Belgium and Norway was the ICOR substantially reduced. These countries illustrate

TABLE 1.5

Western Europe and United States: investment ratios[a] and ICORs[b]

Country	Investment ratios						Incremental capital outpu		
	Total economy			Less investment in dwellings			Total economy less dwe		
	1950–1969	1950–1959	1960–1969	1950–1969	1950–1959	1960–1969	1950–1969	1950–1959	1
Industrial western Europe									
Austria	26.2	24.0	28.4	21.1	18.9	23.5	4.1	3.3	
Belgium	22.4	20.7	24.1	16.2	14.7	17.7	4.2	4.9	
Denmark	21.0	17.6	24.5	17.1	14.2	19.9	4.2	4.3	
Federal Republic of Germany	27.0	24.5	29.5	20.2	17.7	22.7	3.1	2.3	
Finland	27.3	26.0	28.6	21.2	20.0	22.3	4.8	4.7	
France	23.7	19.7	27.6	17.8	15.1	20.5	3.4	3.3	
Ireland	..	..	21.9	..	..	18.2	..	..	
Italy	22.1	20.5	23.5	15.6	14.7	16.3	2.9	2.8	
Netherlands	26.0	24.0	28.0	20.8	18.8	22.8	4.0	3.9	
Norway	32.0	32.0	32.0	26.7	26.1	27.1	6.3	7.7	
Sweden	24.4	22.6	26.4	18.4	17.0	19.8	4.6	4.8	
Switzerland	23.9	20.1	27.8	18.3	15.1	20.5	..	..	
United Kingdom	17.5	15.0	20.0	14.0	11.9	16.1	5.2	5.0	
Southern Europe									
Greece	23.1	17.9	28.4	19.4	14.1	21.5	3.2	2.5	
Portugal	18.8	15.8	20.0	14.8	12.4	15.8	2.8	3.0	
Spain	22.6	19.8	24.3	16.7	13.1	18.9	2.8	3.6	
Turkey	..	..	17.5	..	..	14.3	..	..	
Yugoslavia	29.0	27.3	19.8	..	..	..	4.1	3.3	
United States	18.9	19.3	18.4	13.7	13.4	13.9	3.7	4.8	

	Manufacturing investment ratios			Manufacturing ICORs		
	1950–1969	1950–1959	1960–1969	1950–1969	1950–1959	1960–1969
Industrial western Europe						
Austria[c]	..	..	15.9	..	..	3.5
Belgium	18.1	15.3	20.1	3.4	3.8	3.3
Denmark	8.5	6.7	10.4	1.8	2.0	1.8
Federal Republic of Germany[d]	18.3	17.8	18.8	2.3	1.8	3.0
Finland	19.6	17.8	21.3	3.4	3.6	3.4
France[d]	21.1	18.2	23.9	3.6	3.6	3.7
Ireland[e]	..	..	19.8	..	..	3.0
Italy	19.6	21.4	18.1	2.5	2.8	2.3
Netherlands	20.3	18.9	21.8	3.2	3.3	3.2
Norway	18.5	18.0	19.1	3.9	5.0	3.5
Sweden	16.4	16.0	16.8	3.2	4.4	2.5
United Kingdom	12.6	12.1	13.0	3.8	3.9	3.8
Southern Europe						
Greece	20.3	21.2	19.5	2.5	2.6	2.5
Portugal	15.1	11.6	17.6	1.8	1.4	2.0
Turkey[d]	..	..	21.8	..	..	2.7
Yugoslavia	..	..	23.9	..	..	2.6
United States[f]	11.7	11.4	12.0	3.0	5.4	2.2

Sources: See *The ECE Region in Figures*, especially tables 10, 16, 20, 24, supplemented by OECD, *National Accounts of OECD Countries*, and secretariat estimates.

[a] Ratio of gross fixed capital formation to GDP (or gross fixed capital formation in manufacturing to value added in manufacturing) at 1963 prices, for all years in period shown.

[b] Gross fixed capital formation in period shown divided by growth of output in periods shown in tables 1.2 and 1.3.

[c] Output includes mining; investments include mining and constructio

[d] Investments include construction.

[e] Output includes construction activity; investments include constructi

[f] Investment ratios have been calculated on the basis of output and in ratios at current prices.

the process of convergence. The Federal Republic—where output was rising particularly fast in the 1950s, with increasingly full use of labour and other resources and a low ICOR—adjusted in the 1960s to an investment ratio, and to growth rates of output and employment, much closer to the average of other countries. In Belgium and Norway, with relatively low growth rates of output and employment in the 1950s, both output and employment increases accelerated in the 1960s, but the investment ratios changed less. For manufacturing industry, the picture is basically similar, but it may be noted that considerably accelerated output and productivity growth in Swedish manufacturing was accompanied by only a small increase in the investment ratio (not particularly high in the 1950s) and by a considerable reduction in the ICOR.

The data on investment trends may be amplified for the Federal Republic of Germany and the United Kingdom by changes in the total stock (including dwellings) of fixed assets (for both countries estimated by the "perpetual inventory" method):

Annual percentage growth rates

	Federal Republic of Germany		United Kingdom	
	1958–1960 / 1950–1952	1967–1969 / 1958–1960	1958–1960 / 1950–1952	1967–1969 / 1958–1960
1. Gross fixed capital stock	5.1	6.0	2.6	3.8
2. GDP	7.5	5.1	2.4	2.9
3. Employment	2.2	0.3	0.5	0.4
4. Capital per worker	2.9	5.7	2.1	3.4
5. Output per unit of capital	2.4	−0.9	−0.2	−0.9
6. Output per worker	5.2	4.8	1.8	2.5

Sources: Federal Republic of Germany: *Wirtschaft und Statistik* No. 10, 1971; United Kingdom: *National Income and Expenditure* 1969 and 1971.

These estimates certainly suggest that the faster growth of capital per worker in the Federal Republic than in the United Kingdom in the 1960s, and in the United Kingdom in the 1960s against the 1950s, has played an important part in the relative growth rates of labour productivity and of total output.[27] Just how large is this contribution must depend on the weights attached to labour and capital inputs.[28]

Southern Europe

In the south European countries (so far as comparable data are available) faster growth of total GDP and productivity than in the industrial west is not associated with notably higher over-all investment ratios, except in Yugoslavia. Consequently ICORs have tended to be significantly lower, suggesting bigger output returns to investment in the south. The same is broadly true for manufacturing alone.

Eastern Europe and the Soviet Union

Economic growth in eastern Europe was stimulated by greater inputs of both labour and capital than in industrial western Europe, as well as by the much more marked shift towards industry in the economic structure. The annual 7 per cent growth of GDP for the whole area, over the two decades, was associated with increases of 1.7 per cent a year in employment and 6.1 per cent in the fixed capital stock.[29] Both capital stock and employment, as well as output, rose fastest in the Soviet Union. A general tendency towards convergence in capital stock per man can be observed: in the Soviet Union and in Bulgaria, where capital stock per man was relatively low in the early

Changes in factor inputs and factor productivity, 1950–1952 to 1967–1969

Annual cumulative percentages
(Rank order in brackets)

	Gross domestic product	Employment	Fixed capital stock	Labour productivity (1) ÷ (2)	Capital per man (3) ÷ (2)	Output per unit of capital (1) ÷ (3)
Soviet Union	7.6(1)	2.0(1)	8.8(1)	5.5(3)	6.7(1)	−1.1(7)
Romania	7.2(2)	0.9(5)	6.1(3)	6.2(2)	5.2(3)	1.0(4)
Bulgaria	6.9(3)	0.5(6)	6.7(2)	6.4(1)	6.2(2)	0.2(6)
Poland	6.1(4)	1.8(2)	3.4(6)	4.2(5)	1.6(7)	2.6(2)
German Democratic Republic	5.7(5)	0.4(7)	2.8(7)	5.3(4)	2.4(5)	2.8(1)
Czechoslovakia	5.2(6)	1.2(3)	3.6(5)	4.0(6)	2.4(5)	1.5(3)
Hungary	4.8(7)	1.0(4)	4.1(4)	3.8(7)	3.1(4)	0.7(5)
Total eastern Europe	7.0	1.7	6.1	5.2	4.3	0.8

Sources: Tables 1.2 and 1.6.

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[27] It should be remembered that the relatively slow growth of capital per worker in the 1950s in the Federal Republic of Germany, although labour productivity was rising fast, must be due in part to fuller use of the existing capital stock.

[28] If inputs are weighted by income shares (about 70 : 30 for labour: capital) it will be seen that, in the 1960s, crude inputs of capital and labour "accounted for" about 2 per cent a year of the 6 per cent growth of GDP in the Federal Republic of Germany and about 1.5 per cent of the 3 per cent growth in the United Kingdom, leaving the rest to be explained by changes in efficiency of production factors, etc. But it is highly doubtful whether this kind of calculation can give a fair impression of the real relative contributions.

[29] Data for fixed capital stock in eastern Europe are obtained by periodical inventories brought up to date by annual investment statistics. They are generally gross stocks, deducting scrapping but not, as a rule, allowing for obsolescence.

TABLE 1.6

Eastern Europe: total economy fixed capital stock, capital per person employed and capital productivity

(Annual percentage compound rates of growth)

Country	*Fixed capital stock*			*Fixed capital per person employed*			*Output per unit of fixed capital*		
	1950–1952 to 1967–1969	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*	*1950–1952 to 1967–1969*	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*	*1950–1952 to 1967–1969*	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*
Bulgaria	6.7	5.3	7.9	6.2	4.6	7.5	0.2	1.0	−0.5
Czechoslovakia	3.6	3.2	3.8	2.4	2.2	2.5	1.5	2.4	1.0
German Democratic Republic	2.8	1.9	3.6	2.4	1.2	3.5	2.8	5.1	0.9
Hungary	4.1	3.6	4.6	3.1	2.4	3.9	0.7	0.5	0.9
Poland	3.4	2.7	4.0	1.6	1.0	2.1	2.6	3.4	1.9
Romania	6.1	4.9	7.1	5.2	3.5	6.7	1.0	1.3	0.8
Soviet Union	8.8	9.3	8.4	6.7	7.3	6.2	−1.1	−0.9	−1.4
Eastern Europe	6.1	5.7	6.5	4.3	3.9	4.7	0.8	1.8	0.0

Sources: See table 1.3.

NOTE.—For corresponding data on gross domestic product, employment and output per man, see table 1.2.

TABLE 1.7

Eastern Europe: investment ratios and ICORs

Country	*Investment ratios*			*Incremental capital-output ratios*		
	1950–1968	*1950–1959*	*1960–1968*	*1951–1969*	*1951–1960*	*1960–1969*
Bulgaria	22.4	15.7	25.8	2.9	1.9	3.6
Czechoslovakia	17.4	14.9	18.8	3.1	2.3	3.9
German Democratic Republic	16.9	13.8	18.7	2.7	1.6	4.6
Hungary	21.0	18.1	22.7	4.0	3.5	4.2
Poland	19.7	16.9	21.2	3.1	2.4	3.6
Romania	24.2	16.4	28.1	3.0	1.9	3.7
Soviet Union	17.8	15.7	18.8	2.3	1.7	2.8

Sources: Basic data from national statistical yearbooks (for fixed capital investment) and table 1.2 (for gross domestic product).

NOTE.—Investment ratios show total gross fixed capital formation as a percentage of gross domestic product; incremental capital-output ratios are calculated with a one-year time lag between capital investment and the increase in gross domestic product.

Investment ratios and incremental capital-output ratios cannot be compared without important qualifications either between east European countries or between east and west European countries, because of major differences in the relative prices of investment goods. For these calculations it was assumed that the investment price deflator is on average about 60 (GDP price deflator = 100) but deflators for individual countries were reckoned to vary between 50 and 80.

1950s, the total capital stock increased by 3 to 4 times by the late 1960s; in the other countries, better endowed with capital in the earlier years, the increase was by 1½ to 2 times.[30]

Broadly speaking, rates of output growth are correlated with rates of increase of inputs (see table at foot of previous page), but with significant exceptions. In both Romania and Bulgaria, fast growth of output was associated with relatively fast growth of capital; with rather slow growth in employment, labour productivity and capital per worker grew particularly fast. In Poland, by contrast, employment increased faster than elsewhere, but capital stock rather slowly. These contrasts may suggest a certain amount of factor substitution in response to labour supply conditions, but they are also linked to the changes in the structure of output.

The familiar, if not very precise, positive association holds between the growth of labour productivity and the growth of total output, but the association differs considerably between countries and time-periods.[31] A loose link can also be observed between increases in labour productivity and increases in capital per man.

Between the 1950s and the 1960s the "input intensity" of total output appears to have increased. While the growth of output slowed down in the 1960s, employment rose at an unchanged rate and the growth of capital stock accelerated. Thus the growth of labour productivity slowed down and in the 1960s output per unit of capital stock (capital productivity) ceased to rise (see tables 1.2 and 1.6). These relationships varied a great deal from country to country but in the two least industrialized countries, Bulgaria and Romania, and also in Hungary, both labour productivity and output accelerated. The most common feature was the faster rise in capital stock in the 1960s, both in total and per man; this holds for all countries except the Soviet Union, where the increase in capital stock and in capital per worker had been remarkably fast in the 1950s (and in the two decades taken together).

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[30] The rates of increase of capital stock may be influenced by changes in valuation practice. Thus the larger increases may in part result from relative undervaluation of the initial stock. Nevertheless the statistics will indicate the general trend towards convergence: thus the coefficient of variation of capital per worker between the seven countries, in relation to an average for the whole area, fell from 93 per cent in 1950–1952 to 52 per cent in 1967–1969.

[31] See *Economic Survey of Europe in 1969*, part I, chap. 2(v).

Investment ratios (see table 1.7) tell the same story of accelerating capital inputs in the 1960s but lower returns to investment in terms of output increases. Investment ratios increased everywhere, but most strikingly in Bulgaria and Romania. Consequently, incremental capital-output ratios also rose in every country in the 1960s (as in many west European countries and in industrial western Europe as a whole). The growth of industry, the prime mover of economic development, also evolved in an input-intensive way (see table 1.8). The increase of industrial output by 9.6 per cent a year over the two decades was associated with a growth of 3.1 per cent in industrial employment and of 8.3 per cent in fixed-capital stock. In every country, the growth of each of these variables was substantially faster in industry than in the economy as a whole (the differences were relatively small, however, in Czechoslovakia and the German Democratic Republic). Everywhere, the gains in industrial labour productivity were distinctly greater than in agriculture (unlike western Europe) or the construction and service sectors, and were generally greater, the faster the growth of output.

As in the economy as a whole, a slowing down in the rate of output growth in industry, between the 1950s and the 1960s, was generally accompanied by a slowing down of labour productivity gains, while the growth of capital stock accelerated. Thus in the 1960s capital productivity in industry, in the area as a whole, did not increase (it fell significantly in Bulgaria but continued to rise in Romania).

The increases in capital per worker in industry, however, were not markedly greater than in the whole economy—5.1 per cent a year in industry for the area as a whole, compared with 6.7 per cent in agriculture, and only 1.4 per cent in construction and services. (Only in Romania did capital per worker in industry rise as much as in agriculture.) In most countries, agriculture became increasingly capital-intensive as employment fell, the capital stock rising by 5.5 per cent a year while output rose by 3 per cent. Output per unit of capital in agriculture fell in all countries.

In the *construction and service sector* (for which estimates of output change are necessarily somewhat uncertain) employment increased (4 per cent a year in the area as a whole) faster than in industry, both in the 1950s and the 1960s; but the increases in capital stock were somewhat less (about 5.5 per cent, as in agriculture). Both the employment and capital stock increases were particularly modest in the German Democratic Republic and Hungary.

(iv) Consumption trends

Private consumption at constant prices rose by about 4.5 per cent a year in industrial western Europe over the two decades, about the same as gross national product. Collective, or public consumption[32] rose more slowly but the difference disappears when military expenditure is excluded. In southern Europe (for the countries for which data are available) the increases were faster, but less than the rise in GNP. In eastern Europe, a rough calculation suggests that total private and collective consumption of goods and services, according to the SNA concept, rose by about 6-6.5 per cent a year—again somewhat less than GNP in accordance with the continued emphasis on

	Annual compound growth rate 1950–1952 to 1967–1969			*Percentage shares in GNP at market prices, 1967–1969*		
	Industrial western Europe	*Southern Europe*[a]	*Eastern Europe*	*Industrial western Europe*	*Southern Europe*	*Eastern Europe*
Private consumption	4.5	5.4	6.5[b]	61	69	74–75[b]
Collective consumption	3.4	5.0		14	9	
Gross fixed investment	6.7	8.9	9.7	23	24	21[b]
Exports[c]	7.6	11.6	9.2	24	15	..
Imports[c]	7.8	10.8	9.4	23	19	..
Total GNP	4.6	6.0	7.0	100	100	100

[a] Includes only Greece, Portugal and Spain. In Yugoslavia, private consumption during the 1960s grew (at constant prices) at about the same rate as gross material product (7.5 per cent a year), but faster after 1965.

[b] Estimate based on the actual internal market price relatives between investment and consumer goods; if some allowance is made for the higher tax rates on consumption, the rate of increase of total consumption may be estimated at 6 per cent, and its share of GNP at 65 per cent.

[c] For western and southern Europe, exports and imports of goods and services (national accounts concept); for eastern Europe, exports and imports of merchandise only.

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[32] "Public consumption" is public current expenditure on goods and services only. It excludes transfer payments to households (expenditure from such payments being of course included in private consumption).

Table 1.8

Eastern Europe: factor inputs and factor productivity in major sectors

(Annual percentage compound rates of growth)

A = 1950–1952 to 1967–1969
B = 1950–1952 to 1958–1960
C = 1958–1960 to 1967–1969

	Output (value added)			*Employment*			*Fixed capital stock*			*Output per person employed*			*Fixed capital per person employed*			*Output per unit of fixed capital*		
	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
Industry (mining, manufacturing and utilities)																		
Bulgaria	13.3	15.5	11.5	6.0	7.4	4.8	13.7	13.4	14.0	6.9	7.5	6.4	7.3	5.6	8.8	−0.4	1.8	−2.2
Czechoslovakia	6.7	8.0	5.5	2.3	2.7	2.0	4.8	4.6	5.1	4.3	5.2	3.4	2.4	1.8	3.0	1.8	3.2	0.4
German Democratic Republic	7.5	10.1	5.2	0.6	1.3	−0.1	4.7	3.6	5.7	6.9	8.7	5.3	4.1	2.3	5.8	2.7	6.3	−0.5
Hungary	7.9	7.1	8.7	3.8	4.8	3.0	8.1	8.5	7.8	3.9	2.2	5.5	4.1	3.5	4.7	−0.2	−1.3	0.8
Poland	8.9	9.4	8.3	3.7	4.0	3.5	5.1	3.1	7.0	5.0	5.2	4.6	1.4	−0.9	3.4	3.6	6.1	1.2
Romania	12.6	11.9	13.2	4.3	3.8	4.8	9.6	8.4	10.7	8.0	7.8	8.0	5.1	4.4	5.6	2.7	3.2	2.3
Soviet Union	10.3	11.2	9.4	3.2	2.8	3.5	10.8	11.8	10.0	6.9	8.2	5.7	7.4	8.8	6.3	−0.5	−0.5	−0.5
Eastern Europe	9.6	10.6	8.8	3.1	2.9	3.2	8.3	7.9	8.6	6.3	7.5	5.4	5.1	4.9	5.2	1.2	2.5	0.2
Agriculture (including forestry and fishing)																		
Bulgaria	1.6	1.3	1.8	−3.0	−1.9	−3.9	6.9	5.1	8.6	4.7	3.3	5.9	10.2	7.1	13.0	−5.0	−3.6	−6.3
Czechoslovakia	−0.4	−0.5	−0.3	−2.6	−2.1	−3.0	5.0	4.3	5.6	2.3	1.6	2.8	7.8	6.5	8.9	−5.1	−4.6	−5.6
German Democratic Republic	2.0	2.3	1.7	−2.4	−2.6	−2.3	4.9	3.2	6.4	4.5	5.0	4.1	7.5	6.0	8.9	−2.8	−0.9	−4.4
Hungary	1.1	2.0	0.5	−1.9	−0.8	−2.8	4.4	4.4	4.5	3.1	2.8	3.4	6.4	5.2	7.5	−3.2	−2.3	−3.8
Poland	1.9	2.2	1.6	0.0	−0.1	0.0	2.4	1.8	3.0	1.9	2.3	1.6	2.4	1.9	3.0	−0.5	0.4	−1.4
Romania	2.8	3.3	2.2	−1.1	0.4	−2.3	3.7	2.4	4.8	3.9	2.9	4.6	4.9	2.0	7.3	−0.9	0.9	−2.5
Soviet Union	3.8	5.7	2.1	−0.9	−0.2	−1.6	7.4	8.0	6.9	4.7	5.9	3.8	8.4	8.2	8.6	−3.4	−2.1	−4.5
Eastern Europe	3.1	4.4	1.9	−1.0	−0.3	−1.7	5.6	5.3	5.9	4.1	4.7	3.7	6.7	5.6	7.7	−2.4	−0.9	−3.8
Rest of economy (construction, material and non-material services)																		
Bulgaria	6.8	6.4	7.2	4.4	4.4	4.4	4.6	3.8	5.3	2.3	1.9	2.7	0.2	−0.6	0.9	2.1	2.5	1.8
Czechoslovakia	5.7	6.1	5.4	2.8	2.5	3.2	2.8	2.6	3.1	2.8	3.5	2.1	0.0	0.1	−0.1	2.8	3.4	2.2
German Democratic Republic	4.5	5.1	4.0	1.6	1.9	1.3	1.7	1.1	2.2	2.9	3.1	2.7	0.1	−0.8	0.9	2.8	4.0	1.8
Hungary	3.3	2.6	3.9	2.0	1.5	2.4	2.9	2.3	3.5	1.3	1.1	1.5	0.9	0.8	1.1	0.4	0.3	0.4
Poland	6.1	6.4	5.8	3.2	3.1	3.3	3.0	2.8	3.2	2.8	3.2	2.4	−0.2	−0.3	−0.1	3.0	3.5	2.5
Romania	6.2	5.5	6.8	4.4	3.9	4.9	5.0	4.3	5.6	1.7	1.5	1.8	0.6	0.4	0.7	1.1	1.2	1.1
Soviet Union	6.9	7.5	6.3	4.3	4.2	4.5	8.3	8.6	8.0	2.5	3.2	1.7	3.8	4.2	3.3	−1.3	−1.0	−1.6
Eastern Europe	6.4	6.8	6.0	3.9	3.7	4.1	5.4	5.0	5.8	2.4	3.0	1.8	1.4	1.2	1.6	0.9	1.7	0.2

Sources: See table 1.3.

investment growth. From incomplete national statistics of material product,[33] it appears that private consumption rose somewhat less than collective consumption.

Private consumption per head rose by about 3.7 per cent per year in western Europe, 4–5 per cent in southern Europe and by about 5 per cent in eastern Europe; since the early 1950s, it thus nearly doubled in western Europe, and more than doubled both in the three south European countries here considered and in eastern Europe. Comparisons with pre-war are shaky and, in view of the profound changes in consumption patterns, may also be misleading. It appears, nevertheless, that in western Europe, the level of consumption per head at the end of the 1940s was about on the same level as in 1937–1938, or possibly slightly greater.[34] In eastern Europe, the increase between the pre-war level and the end of the 1960s may have been somewhat less; the pre-war level of consumption was reached later than in western Europe; the difference may be offset by the faster increase in collective consumption than in the west.

Both in western and southern Europe, private consumption expanded somewhat more rapidly in the 1960s than in the 1950s (for southern Europe in line with the acceleration in output growth). In western Europe, where total output expanded at a steady rate in each of the two decades, the slight acceleration in private consumption reflects a slowing down in the growth of investment (from 7.1 to 6.3 per cent per year). In eastern Europe, the growth of consumption slowed down somewhat in the 1960s in line with the deceleration of aggregate output; in countries where output growth accelerated in the second decade, consumption also expanded faster though to a lesser degree. It should be remembered that in the first half of the 1950s, fast expansion was still needed in most eastern countries to recover the pre-war level; rationing was still in force for essential consumer goods side by side with free purchases at higher prices, which distorted recorded consumption levels and patterns.

There were marked shorter-term fluctuations in the growth rate of consumption in eastern Europe, influenced less by changes in output growth than in allocation policy. By and large, restrictions on investment growth were accompanied, after a time-lag, by faster consumption growth (e.g. in the mid-1950s in Poland and Czechoslovakia and in the later 1950s in Hungary), while sudden accelerations in investment growth were soon followed by slow-downs in growth of consumption (in Czechoslovakia and Hungary in the early 1950s and in most countries in the first half of the 1960s).

In western Europe, prices rose somewhat more rapidly in the 1960s than in the 1950s, reflecting the stronger inflationary pressures. In eastern Europe, consumer prices have been generally more stable and for the most part remained under central control; imbalances in consumer markets manifested themselves by shortages and queues. Such price changes as occurred resulted from policy measures rather than from autonomous developments. By and large, consumer price indices rose everywhere in the first post-war investment period, but declined throughout the later 1950s; in the 1960s they were allowed to increase in most countries of the area. However, in the German Democratic Republic and in the Soviet Union over-all consumer price levels in the 1960s were remarkably stable, an increase in food prices (and prices of services in the German Democratic Republic) being offset by price reductions of industrial commodities.

At the end of the 1960s, the share of private consumption ranged from about 53 to 64 per cent of gross national product at market prices in industrial west European countries. In south European countries the share was somewhat higher (about 70 per cent), with a smaller share of public consumption and, in some countries, of investment. The share of public consumption ranged from 13 to 22 per cent of total GNP at market prices in industrial western countries. In the south European countries, the range was from 10 to 13 per cent of total GNP. (Of course not all collective consumption accrues directly to households.)

It is extremely difficult to arrive at estimates of the share of consumption in eastern Europe on a basis comparable with the market economies. This is not only because of differences in accounting definitions but also because of different relative prices of investment and consumer goods. At the price relatives actually applied in the east European countries, the share of gross fixed investment in gross national product, for the area as a whole at the end of the 1960s, averaged about 21 per cent, and together with stock changes, etc., to about 26 per cent, leaving about 73 per cent for private and public consumption.[35] This is similar to the national expenditure pattern in the European market economies. However, the turnover tax is largely concentrated on consumer goods, increasing their prices relative to investment goods as compared with western price patterns. Allowing for a more even distribution of the turnover tax,[36] it appears that the share of gross domestic investment (including additions to stocks, etc.) for eastern Europe might be as much as 35 per cent, leaving about 65 per cent for total consumption, varying

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[33] i.e. excluding non-material services bought by consumers and the wage costs of institutions providing collective services free of charge.

[34] See I. Svennilson, *Growth and stagnation in the European economy*, ECE, Geneva 1954, p. 27 ff; and M. Gilbert and Associates, *Comparative National Products and Expenditure*, Paris 1958.

[35] For three countries, the following breakdown of GNP by types of expenditure roughly corresponding to SNA concepts has been estimated, leaving national price relatives unchanged.

Percentage shares in GNP by type of expenditure in 1969

	Czechoslovakia	*German Democratic Republic*	*Hungary*
GNP	100	100	100
Gross fixed capital formation	23	22.5	26
Stock change, losses and statistical discrepancies	5	3.5	3
Personal consumption	58	65	60
Collective consumption	14	9	9
of which:			
cultural, social and health services (including commodities) rendered to population	7	3	..
Net exports	—	—	2

Source: Based on national statistical yearbooks.

[36] See *Economic Survey of Europe in 1969*, part I, chap. 4 (iii).

Private consumption trends in western (including southern) Europe

	Annual compound growth rates (per cent, constant prices)			*Ratio to growth in total private consumption*			*Annual increase in implied prices* (per cent)		
	1950–1952 to 1967–1969	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*	*1950–1952 to 1967–1969*	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*	*1950–1952 to 1967–1969*	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*
Food[a]	3.6	3.8	3.4	0.81	0.89	0.74	2.2	1.8	2.6
Clothing	4.3	4.2	4.4	0.96	0.97	0.95	1.2	0.2	2.1
Rent	4.2	3.7	4.6	0.93	0.86	1.00	5.2	4.8	5.5
Durables[b] . . .	7.4	7.6	7.3	1.66	1.77	1.59	1.6	1.8	1.4
Other[c]	4.7	4.2	5.0	1.05	0.98	1.10	3.0	2.8	3.1
Total	4.5	4.3	4.6	—	—	—	2.6	2.2	2.9

[a] Including drink and tobacco.
[b] Transport equipment, domestic appliances, etc.
[c] Includes fuel, light, household requisites and sundry services.

between 60 and 70 per cent in individual countries. The share of public consumption in total consumption varied considerably from country to country (see the table in footnote 35) but apparently did not exceed 14 per cent of gross national product.

Private consumption by main categories

In western Europe, the volume of expenditure rose fastest for durables and least for food, drink and tobacco. Growth rates of expenditure were fairly similar to the over-all growth rates for clothing, rent and "other" (mainly services). Prices rose most for rent (partly reflecting progressive decontrol as well as the general fast rise in house prices and improvement in standards); they rose least for the manufactured categories, clothing and durables. However, the small price increase for clothing is mainly due to developments in the 1950s when prices hardly increased at all (largely because of the fall in fibre prices in the first half of the 1950s following the disappearance of war shortages and the end of the Korean War).

The falling ratio to total consumption increases of growing expenditure on durables no doubt reflects the small stocks of most durables at the beginning of the 1950s; it is well known that in this field the initial stock exerts a strong influence on future development. At the end of the 1960s, the total passenger-car park in western Europe amounted to about 60 million as against 6 million at the beginning of the 1950s.

At the end of the 1960s, food accounted for about 30 per cent of total private consumption in west and south European countries combined (at 1963 prices), clothing, rent and durables for about 10 per cent each, and the remaining 40 per cent was accounted for by other expenditure (fuel, light, household appliances and services). Inter-country differences in shares are still considerable, reflecting many factors but in particular the level of income per head. Thus, food's share in total private consumption at the end of the 1960s was around 40 per cent in the south European countries and around 23 to 26 per cent in the richest countries of western Europe. Relative prices may also exert an influence. For instance, the high share of food in total consumption expenditure in Italy (40 per cent) may be partly due to high prices for food in relation to prices for industrial goods and services. Shares of clothing and rent differ less with income per head. By contrast, both the share of durables and that of "other expenditure" (mainly services) are higher in countries with higher income levels; these very broad results of cross-country comparisons are basically consistent with the changes over time.

Changes in the share of major consumption categories do not reveal the whole movement from primary goods towards more processed goods and towards services. For instance, as income increases, the non-agricultural content of expenditure on food also increases. The post-war European experience suggests that at an income level of $500, the non-agricultural content of consumers' food expenditure (i.e. processing and distribution) is about

Changes in the volume of retail trade turnover in eastern Europe

	Annual compound growth rates, per cent			*Ratio to growth of total turnover*			*Percentage share in total*[a]			*Implied relative price index (1960=100)*	
	1960–1970	*1960–1965*	*1965–1970*	*1960–1970*	*1960–1965*	*1965–1970*	*1960*	*1965*	*1970*	*1965*	*1970*
Food	6.3	5.9	6.8	0.94	1.04	0.88	52.8	55.3	53.2	104	104
Non-food . .	7.1	5.4	8.7	1.06	0.95	1.13	47.2	44.7	46.8	96	96
Total . .	6.7	5.7	7.7	—	—	—	100	100	100	—	—

[a] In current prices.

40 per cent, and at an income level of $2,000 it is 70 per cent of the total.[37] Similarly, expenditure on clothing (at constant prices) rose more than consumption of textile materials.

The narrowing of the spread of growth rates of output among western countries between the 1950s and the 1960s was also reflected in the narrower spread of private consumption levels, both in total and in each major category.

For eastern Europe, no comparable data are available, but certain shifts in the expenditure pattern can be observed from the growth of retail trade turnover (in constant prices). The annual growth rates given above are not directly comparable with those of total consumption insofar as retail trade growth must reflect also the marked shift of population from self-contained farming economies to commercialized urban communities.

Up to 1965 purchases of food—and also food prices—rose faster than those of other goods in all countries of the area (except Poland). Thereafter, it was non-food sales that increased most (except in the German Democratic Republic).

Collective consumption and transfer payments

Private consumption provides only a partial indication of living standards. In all countries, a part of household needs is provided free (particularly for health and education). Unfortunately, few data are available on collective consumption. In the mid-1960s, it appears that "collective consumption" in the sense of direct government provision to households of goods and services for education and health represented a remarkably uniform proportion of the final disposable incomes of households (including such free goods and services) in the industrial western countries—from 7.5 to 10 per cent, being greatest in Sweden. In addition, the proportions of transfer payments (largely social security benefits) and subsidies varied more widely—between 10 and 15 per cent of final disposable income. Together, these elements of collective provision accounted in the mid-1960s for between a fifth and a quarter of final disposable income.[38] For the eastern countries, income from social funds, covering both categories, constituted in the early 1960s between 20 and 30 per cent of total income in money and in kind of the population.[39] In the Soviet Union in 1970, 26 per cent of the total income of wage- and salary-earners was received in money and kind from social funds.[40] The division between transfers in kind and in money cannot be made so easily, but it appears that there is more emphasis on direct provision in kind in the eastern than in the western countries.[41]

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[37] See the *Economic Survey of Europe in 1969*, part I, table 3.21.

[38] See "Incomes in Post-war Europe: A study of policies, growth and distribution," *Economic Survey of Europe in 1965*, part 2, chap. 6, table 6.8.

[39] See *Incomes in Post-war Europe*, chap. 7 and table 7.7.

[40] CMEA *Statistical Yearbook 1971*.

[41] Data for the German Democratic Republic and Czechoslovakia have been regrouped according to SNA concepts used in the west:

The composition of final disposable income
(Percentages)

	German Democratic Republic[a]		*Czechoslovakia*
	1960	*1969*	*1970*[b]
Income from:			
Work and property	87.5	83.4	75.5
less: direct taxes and social insurance contributions	12.5	11.8	11.7
Primary income after taxes	75.0	71.6	63.8
Net current transfers from general government	7.4	8.5	16.3
Subsidies	17.6	19.9	8.1
Collective consumption			11.8
Total	100.0	100.0	100.0

Sources: Statistisches Jahrbuch der DDR 1971, p. 353; *Statistická ročenka ČSSR 1971*, pp. 460, 161.

NOTE.—The data for the two countries are not strictly comparable; the Czechoslovak data include households of pensioners, so that the share of net current transfers is necessarily bigger than in the German Democratic Republic, and that of income from work and property necessarily smaller. However, the shares of collective consumption (including subsidies) are roughly comparable, and are practically identical.

[a] Refers to households of workers and employees.

[b] Refers to total population.

CHAPTER 2

MAJOR TRENDS IN INTERNATIONAL TRADE AND PAYMENTS

In section (i) of this chapter, a quick summary is attempted of some of the main policy developments affecting the evolution of trade and payments in Europe since the Second World War. Against this background, section (ii) describes the course of the major flows in international merchandise trade and section (iii) balance-of-payments developments (this last section being restricted to the market economies for lack of data for eastern Europe).

(i) The evolution of policies [42]

At the end of the war, the central objective of international commercial and financial policy among the industrial market economies was seen as the general liberalization of international trade and payments from the restraints established in the 1930s. It was recognized that progress must be made by stages. Thus in western Europe discrimination in favour of non-dollar imports and extensive bilateral balancing were accepted in the difficult early years, and followed by increasing multilateralism through the European Payments Union. The ultimate objective inspired a systematic effort towards the dismantling of the restrictions on current and capital transactions and towards general external convertibility of currencies. New international institutions were set up as instruments for achieving these aims. The results of co-operation in a policy of liberalization, in an era of fast economic development, have been seen in the vigour of trade expansion and in the increasing interdependence of national economies.

But this mainstream towards the objectives of a liberal policy has been modified by major developments in the international economy which were hardly foreseen when the foundations were laid in the 1940s.

(*a*) The evolution of the United States balance of payments exercised a major influence on the payments and liquidity position of western Europe. The early post-war years of dollar shortage, met in large part by United States grants and loans under the European Recovery Programme, gave way from the late 1950s to large inflows of dollars—resulting from the excess of United States capital outflow, both long- and short-term, over the current surplus. These funds, supplemented by the sterling assets accumulated during the war by a number of countries, helped to provide international liquidity to facilitate the growth of trade and output in western Europe. It was never expected, however, that the system would rest so heavily on the supply of one, or two, national currencies; indeed the authorities in some countries whose currencies might have served the same purpose discouraged their use in this way. Nor, perhaps, was it expected that international movements of capital, especially of short-term funds, would be so large and disturbing an influence on the preservation of international equilibrium. The efforts to expand the supply of international liquid assets led eventually to the agreement in 1969 on the creation of Special Drawing Rights, but only after a long series of *ad hoc* arrangements (such as those between leading central banks) [43] to meet individual crises. Although these arrangements may be described as *ad hoc*, they implied an important degree of co-operation among the authorities concerned.

(*b*) The system as originally established implied an element of flexibility in the system of fixed exchange rates to meet persistent disequilibria in payments balances, and machinery for financing temporary disequilibria through the International Monetary Fund (supplemented, for western Europe, by the European Payments Union (1950) and, from 1958, by the European Monetary Agreement). In the event, the national authorities in the principal countries affected by recurrent disequilibria have for the most part struggled to avoid exchange rate adjustments.[44] The effort to reconcile international equilibrium with substantial divergencies in national growth rates and in the conditions governing competitiveness, within a régime of more or less free trade and payments and of generally inflexible exchange rates, put a strain on the effectiveness of domestic economic policies which in the end proved impossible to support. Nor was it fully recog-

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[42] For a more detailed account of the main policy developments affecting Europe, see ECE, *Analytical Report on the state of intra-European trade*, 1970.

[43] Including the "general arrangements to borrow" of 1962, the United States Roosa bonds of 1965 and the separation of the official and private gold markets (1968).

[44] The schedule of exchange parities established among the leading trading countries by 1949 was maintained until 1971, with the following major exceptions in Europe:

1957, 1958	Devaluation: France
1961	Revaluations: Federal Republic of Germany, Netherlands
1967	Devaluations: Denmark, Finland, Ireland, Spain, United Kingdom
1969	Revaluation: Federal Republic of Germany Devaluation: France

nized that international equilibrium should impose policy obligations on surplus countries as well as on deficit countries. The monetary crises of 1971 finally resulted in a set of new exchange rates reflecting, at least in part, the changed competitive situations. The significant feature is that the new rates emerged not, like previous exchange adjustments, from unilateral action but from a multilateral negotiation.

(*c*) Within Europe, the movement towards co-operation which emerged from the Second World War took a variety of forms:

In western Europe, the European Recovery Programme (1948–1952) led to the formation of the Organization for European Economic Co-operation (1948)[45] as an instrument first for the execution of the recovery programme, and later for wider co-operation in economic policy. In the sphere of international policy, the first objective (in 1949) was the progressive elimination of quantitative restrictions on trade; by the end of the 1950s relatively few remained on trade among member countries. This was followed by movements towards the liberalization of current invisible transactions and of capital transactions. Within the GATT framework, the member countries took a leading part in the general series of multilaterally negotiated rounds of tariff reductions culminating in the "Kennedy Round" of 1964–1967.

The formation of economic groupings within Europe must be regarded as modifying the original post-war aim of non-discriminating liberalization (although the GATT rules of most-favoured nation treatment provided exceptions, under defined conditions, for customs unions and free trade areas). The European Economic Community,[46] created by the Treaty of Rome (1957), is of course not only a customs union, with the objective of free movement of goods, services, labour and capital among its members and a common external tariff; it is an ambitious attempt to promote a more complete economic integration. The European Free Trade Area,[47] created by the Stockholm Convention of 1959, sprang from the unsuccessful attempts to create a wider grouping than the EEC within western Europe, but with much looser ties among the members than the commitments involved by the Treaty of Rome. The EFTA agreement provided for a free trade area only in industrial goods, without a common external tariff. The economic relationships between the members of these two groupings are now to be radically transformed by the probable accession of the United Kingdom and of some other EFTA members to the EEC.

(*d*) In at least one other respect, the principle of non-discriminating free trade has been qualified. From the beginning, it was argued by many that the classical principles of universal free trade were not applicable to the pursuit of economic development in the world's poorer countries. The progress of the less-developed countries was a major objective of international action, including both the provision of financial aid—in which most European countries, east and west, have participated—and the promotion of trade. But it was only gradually recognized that trade promotion might require, at least temporarily, preferential treatment. Proposals originating in UNCTAD, in 1968, led to promises by developed countries, now coming into effect, to introduce non-reciprocal tariff preferences on imports from developing countries of manufactures and semi-manufactures—although a number of "sensitive" products are commonly excluded.

Within eastern Europe, the promotion of international economic relations has followed a different course. Before the war, these countries—only in part industrialized—were not trading extensively with each other; the building-up of a high degree of inter-dependence, in association with a general programme of industrialization, needed, and received, a deliberate effort of co-operative planning. The Council of Mutual Economic Assistance (CMEA, or Comecon) was established in 1949; but in the early years, the development of trade between its members, facilitated by the State monopolies of foreign trade, took the form mainly of bilateral trade agreements. From the mid-1950s, co-operation moved towards the co-ordination of national plans through the CMEA, leading to the 1962 agreement on the *Basic principles of the international socialist division of labour*; an increasingly important role was seen for foreign trade, and for co-operation in industry and technology, as activators of structural change and economic development. The reforms of the management and pricing systems in the 1960s, strengthening the incentives for efficient allocation of resources and the stimulus to technological advance and specialization, gave a new impulse to the fuller use of the opportunities for international trade. Bilateral trade agreements came to be operated in a more flexible way and are increasingly integrated with domestic economic policy in the framework of the five-year plans. Bilateral balancing of trade is, on the whole, still pursued, but an element of multilateralism, through credits and clearing arrangements, has been encouraged through the Bank for International Economic Co-operation established in 1964. Far-reaching plans for deeper integration and closer co-ordination of economic plans are contained in the important *Comprehensive programme for the further extension and improvement of co-operation and the development of socialist economic integration*,[48] adopted by the CMEA at its 25th Session in 1971.

Trade between eastern and western Europe, always a central preoccupation of the Economic Commission for Europe, expanded during the early post-war years of dollar shortage and supply difficulties. It was conducted in the framework of bilateral, usually annual agreements, and incorporated a strong element of barter. Trade slowed down in the subsequent period of political tension.

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[45] Transformed in 1961 into the Organisation of Economic Co-operation and Development (OECD); as well as west European market economies, the United States, Canada, Japan and Australia are members and Yugoslavia is an associate member.

[46] Members: Belgium, Federal Republic of Germany, France, Italy, Luxembourg, Netherlands; Greece and Turkey are associate members.

[47] Members: Austria, Denmark, Norway, Portugal, Sweden, Switzerland, United Kingdom. Finland became associated with EFTA in 1961, having reached a special agreement granting the same tariff reductions to the Soviet Union as to EFTA members.

[48] CMEA, *Comprehensive programme for the further extension and improvement of co-operation and the development of socialist economic integration*, Moscow 1971.

An embargo on exports of strategic goods to eastern Europe (subsequently much modified) was imposed by the United States and applied by other NATO countries from 1949. With the improvement in the political climate in the mid-1950s, east-west trade began to expand again, still largely within a régime of annual bilateral agreements providing quotas for specific goods. Liberalization of the trade flows began, but only slowly, from the late 1950s. Some countries introduced mutual convertibility arrangements for current earnings and some quotas were gradually eliminated.[49] An increasing volume of western exports of capital goods was financed by long-term credit. Industrial co-operation agreements spread. And long-term trade agreements were concluded covering not only merchandise exchanges but also arrangements for scientific, industrial and technological co-operation.[50] Recent efforts within the ECE framework to resolve many of the practical problems of east-west co-operation are summarized elsewhere.[51] These efforts recognize the need for a comprehensive strategy for the expansion of a two-way trade flow, including not only the removal of obstacles but also a positive effort to develop new trading opportunities.

Although important differences about the general principles governing foreign trade policy have not been resolved, some degree of pragmatic agreement on their application has been possible—bilaterally, in ECE, and through the membership of some east European countries in GATT. Czechoslovakia has been a member of GATT from the beginning. Poland became a member in 1967, and Romania in 1971, while negotiations for Hungary's accession are in progress. Bulgaria obtained the status of observer in 1967. Although efforts in ECE (e.g. by the expert group which met in 1963–1964) to bridge basic policy differences have not resulted in general agreement among governments, the response to the Executive Secretary's "Analytical Report" of 1970 [51] indicates a willingness to work towards practical solutions for the difficult problems of east-west European trade.

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[49] It was estimated in 1970 that liberalization then extended as a rule to between 50 and 90 per cent of the value of imports from eastern Europe into western Europe. But the quantitative restrictions that remain still have a significant effect since they frequently limit imports of goods which east European countries can readily provide. See ECE, *Analytical Report on the state of intra-European trade* 1970, para. 95.

[50] In 1968, at least 75 such long-term agreements were known to be in force between seven east and 14 west European countries (out of a possible maximum of 91), ECE, *Analytical Report, loc. cit.*, para 96.

[51] See, ECE, *Analytical Report, loc. cit.*; and ECE, *The work of the Economic Commission for Europe 1947 to 1972*, 1972.

(ii) The pattern of expansion in international trade

During the last two decades, while world output of goods and services increased by about 5 per cent a year, the volume of world trade increased by about 7.5 per cent a year. The pre-war level of world output was approximately restored in most areas by the beginning of the 1950s;[52] the process of reconstruction and the bringing into use of unused resources, both labour and capital, temporarily accelerated the growth rate in the first few post-war years. Apart from cyclical and other temporary variations, the growth of world trade continued to increase very steadily throughout the two decades, both in primary products (6 per cent a year) and in manufactures (9 per cent a year).

Can the faster growth of international trade than of output during the post-war period be regarded as merely a prolonged adjustment process, to terminate at some future date? A longer historical perspective may give some pointers to an answer. A tentative attempt is made in the following table, inevitably based on statistics of uncertain comparability, to estimate rates of change in world manufacturing output and world trade over the past 50-60 years.[53] The purpose is to see in what relevant ways post-war experience differs from earlier phases of economic development (see table below).

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[52] In western Europe, the 1937 level of total output was restored well before 1950 but in eastern Europe (including the Soviet Union) probably not until later. In the United States total output was in 1950 as much as 70 per cent greater than in 1937. World output in 1950 was probably some 20–25 per cent above pre-war while the volume of world trade had only just regained the pre-war level.

[53] As estimates of total world output of goods and services are not available over longer periods the comparison is here based on manufacturing output.

World production and trade

Annual rates of change between selected years[a]

	[illegible]	[illegible] to 1929	1929 to 1937	1937 to 1948	1948 to 1955	1955 to 1969	1913 to 1969	1913 to 1969 excl. USSR and US
Manufacturing output	—	6.5	2.5	2.0	6.5	6.0	4.0	3.5
Total trade	−1.0	5.5	−0.5	−1.0	7.5	7.5	3.0	3.0
of which:								
Primary products	−0.5	6.0	0.5	−3.0	6.5	5.5	2.0	2.2
Manufactures	−1.0	5.0	−2.0	1.0	9.0	9.0	3.5	3.5

Sources: See Statistical note at end of this chapter (p. 39).

[a] Rounded to nearest half per cent.

Among the major facts that emerge are:

(*a*) World output during the last two decades grew no faster than in the short period of seven years of economic expansion from 1922 (when the output level of 1913 had been about regained) to 1929 (when expansion was violently interrupted by the Great Depression).

(*b*) But between 1922 and 1929, in contrast with the period after the Second World War, world trade was growing no faster than world output. While trade in primary products increased in 1922–1929 almost in line with manufacturing output (as in 1948 to 1969), trade in manufactures rose significantly more slowly. The striking element in the picture after the Second World War is the much faster growth of the volume of trade in manufactures.

(*c*) One effect of the Great Depression, and of the protectionist measures generally adopted—and maintained, or even strengthened, during the recovery—was to check trade expansion to such an extent that by 1937 the volume of world trade was no greater than in 1929, and in manufactured goods much less, in spite of a 20 per cent increase in manufacturing output.

From one point of view, then, the trade expansion of the post-war period, and especially the expansion of trade in manufactures, may be regarded as a reversion to earlier relationships between trade and output. It appears from the text-table above that by the end of the 1960s the great post-war expansion of world trade in manufactures had no more than restored the trade-output ratio to its level in 1929 (or for that matter in 1922 or 1913, earlier periods when international trade was relatively unencumbered by protectionist barriers).[54] The post-war trade expansion may thus be taken as reflecting the gradual removal of the obstacles erected during the Great Depression and the War.

These conclusions are, of course, based on a very global view. The expansion of the world economy has been accompanied by a radical transformation of its structure. In particular, the number of countries with a fairly extensive industrial capacity has increased from a handful of advanced economies in Europe and North America to most of Europe and to some countries in every continent. Fears that this process would ultimately lead to greater self-sufficiency and progressively narrower limits to the opportunities for international trade in manufactures were common in the inter-war period and were reinforced by the protectionism induced by the Great Depression. Post-war expansion shows that industrialization, granted relative absence of barriers, opens many more new channels for trade among industrial nations than it closes old ones.[55] This is one reason why the faster growth of trade than of output observed over the past 15–20 years may be expected to continue.

Europe in the changing post-war trade pattern[56]

Among the major world regions, Europe took the lead in the growth of both production and trade. Between 1955 and 1969, Europe's trade increased in volume by 8.4 per cent a year compared with the 7.6 per cent growth of world trade (see table 2.1). The import elasticity (ratio of trade growth to growth of output) was not very different from the world average—about 1.5 for imports against GDP and slightly more for exports. These elasticities are about the same as the elasticities for the overseas developed countries,[57] but well in excess of the elasticities of about 1 for the developing countries (see table 2.2). The growth of import volume was slightly greater in eastern Europe than in western Europe; but the growth of output was much faster in eastern Europe so that the elasticity of imports to output growth in eastern Europe (1.2) was substantially less than in western Europe (1.8).

While the volume of world trade in manufactures rose much faster than in primary products (9.2 per cent a year against 5.4 per cent between 1955 and 1969) the difference in current values was even greater (10.0 per cent against 5.2 per cent); from 1955 to 1969 export prices of primary products fell by 15 per cent relatively to export prices of manufactures.[58] The greater increase in the volume of trade in manufactures, on both the import and export side, was marked in both eastern and western Europe.

In the changing geographical pattern of world trade (see table 2.3), some of the most significant changes were:

(*a*) the share in world trade of exports of primary products from the developing countries fell from 20 per cent in 1955 to less than 15 per cent in 1969; the relative decline of this flow—classically regarded as one of the two major flows in the world trade system—is seen in the falling share in world trade of developing countries' exports of primary products both to Europe and to overseas developed countries. The counterpart is the falling share of exports of manufactures to the developing countries both from Europe and from overseas developed countries (the combined share of this second major flow falling from 18 per cent to 13 per cent of world trade). The lessening dependence of Europe on imports of primary products can also be seen in the falling share in world trade of exports of these products from overseas developed

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[54] As the text-table above shows, the trend in the trade-output ratio is only slightly affected by the exclusion of the two giant economies—the United States and the Soviet Union—whose combined share in world output has increased but whose trade-output ratios are very much less than the world average.

[55] Among the detailed statistical demonstrations of this process should be noted *Industrialization and Foreign Trade*, League of Nations, 1945, and Alfred Maizels *Industrial Growth and World Trade*, Cambridge University Press, 1963.

[56] In the rest of this chapter, the account is mainly restricted to the period 1955 to 1969, to avoid the temporary effects of the post-war recovery and the violent disturbances associated with the Korean War and its aftermath. Also, the United Nations Statistical Office data for the world trade network start in 1955. Sources and methods are described in the Statistical Note at the end of this chapter.

[57] The category "overseas developed countries" covers the United States, Canada, Japan, Australia, New Zealand and South Africa.

[58] The United Nations export unit value indices show a relative fall of 20 per cent. These indices do not however include exports of centrally planned economies, for which a price assumption was made (see Statistical Note). Moreover, the UN unit value indices may overstate the rise in prices of manufactures. See Irving B. Kravis and Robert E. Lipsey, *Price Competitiveness in World Trade*, National Bureau of Economic Research, New York 1971, p. 17.

TABLE 2.1

World trade growth 1955 to 1969 by selected trading areas and commodity classes

(Annual rates based on data at constant 1963 prices)

Exports to: *from:*	*Commodity class*	*Eastern Europe*	*Western Europe*	*EEC*	*United Kingdom*	*Rest of EFTA*	*Rest of western Europe*	*Europe*	*Overseas developed*	*Developing countries*	*World*
Eastern Europe	Primary products	4.7	8.3	12.3	3.1	6.2	7.2	5.9	16.0	11.6	6.8
	Manufactures	10.6	11.1	13.2	9.4	9.9	10.5	10.6	13.6	5.8	9.5
	Total	8.4	9.3	12.6	5.0	7.5	8.9	8.6	15.1	7.1	8.5
Western Europe	Primary products	3.0	6.4	8.0	2.4	5.0	6.5	6.3	5.3	3.1	5.8
	Manufactures	14.0	11.1	12.5	9.7	9.4	9.2	11.3	8.0	4.6	9.2
	Total	11.0	9.7	11.1	6.1	8.5	8.8	9.8	7.6	4.4	8.3
EEC	Primary products	2.4	7.8	9.6	2.6	3.9	8.2	7.7	6.3	2.8	7.0
	Manufactures	16.3	11.9	14.0	8.5	8.7	9.8	12.1	11.9	4.9	10.4
	Total	13.3	10.8	12.7	6.4	7.8	9.6	11.0	11.2	4.7	9.7
United Kingdom	Primary products	4.2	4.3	5.1	—	3.5	4.2	4.3	4.3	1.2	3.5
	Manufactures	13.2	7.5	7.9	—	7.4	7.0	7.8	3.2	2.2	4.6
	Total	11.9	7.0	7.5	—	6.6	6.5	7.2	3.3	2.1	4.5
Rest of EFTA	Primary products	1.8	4.4	4.6	1.6	9.8	7.2	3.5	4.9	4.7	4.4
	Manufactures	12.3	11.0	9.8	11.8	12.0	11.4	11.2	9.4	7.0	10.1
	Total	9.3	8.6	7.7	6.0	11.6	10.7	8.6	8.5	6.6	8.3
Rest of western Europe	Primary products	4.0	4.8	5.7	3.4	5.2	—	4.7	5.0	6.3	4.8
	Manufactures	11.1	10.3	8.0	10.8	20.0	—	10.4	14.8	12.7	11.2
	Total	8.1	6.8	6.5	5.5	11.3	—	7.0	9.4	10.3	7.6
Europe	Primary products	4.4	6.6	8.3	2.5	5.2	6.8	6.2	6.4	5.2	6.1
	Manufactures	11.6	11.1	12.5	9.7	9.4	9.3	11.2	8.0	4.8	9.2
	Total	9.1	9.7	11.1	6.0	8.4	8.8	9.5	7.8	4.8	8.4
Overseas developed	Primary products	8.7	2.1	4.0	−0.2	3.4	3.4	2.3	7.2	7.5	5.1
	Manufactures	30.0	8.6	10.8	8.2	8.1	3.6	8.8	10.5	6.0	8.4
	Total	15.9	5.4	7.4	3.0	6.5	3.5	5.6	9.4	6.3	7.3
Developing countries	Primary products	4.7	5.5	6.4	2.4	5.5	10.1	5.4	5.0	4.8	5.2
	Manufactures	7.0	8.6	10.1	4.9	14.3	13.4	8.4	11.3	9.4	9.6
	Total	5.1	5.9	6.9	2.8	6.6	10.3	5.8	6.0	6.1	5.9
World	Primary products	4.6	5.3	6.9	1.5	5.1	7.2	5.2	5.8	5.7	5.4
	Manufactures	11.4	10.5	12.1	8.5	9.4	8.1	10.7	9.6	5.5	9.2
	Total	8.6	8.1	9.6	4.1	8.1	7.8	8.2	8.0	5.6	7.6

Source: Based on United Nations, *Monthly Bulletin of Statistics*, March and November issues. Manufactures are defined as SITC sections 5, 6, 7 and 8.

countries to Europe; they rose by only 2 per cent a year—less than nearly all the substantial inter-regional trade flows.

(*b*) Against these changes can be set the major expansion of trade in manufactures within Europe, rising from 18 per cent to 29 per cent of the volume of total world trade in all commodities. This increase accounted for one-third of the increase in total world trade, and the volume of this flow rose by as much as 11 per cent a year.[59] Both eastern and western Europe shared in the rapid expansion.

In each of the three major groups of countries—Europe, the overseas developed countries and the developing countries—the degree of dependence on international trade increased between 1955 and 1969; total merchandise trade increased from 7.5 per cent of world output of goods and services to 11 per cent. But the only striking increase was in European intra-trade, which rose from 5.5 per cent of European GDP to 9.5 per cent.

Only the developing countries—whose exports to Europe and the overseas developed countries are equal to 11 per cent of their total GDP—depend heavily on trade with the other two groups; their imports from the developed countries are 12 per cent of their total GDP

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[59] A less important but equally fast-rising flow is the exchange of manufactures between overseas developed countries (of which a main element is trade between the United States and Canada).

TABLE 2.2

Import elasticities with respect to GDP growth, based on annual rates 1955 to 1969

Exporting area	Commodity class	Importing area									
		Eastern Europe	*Western Europe*	*EEC*	*United Kingdom*	*Rest of EFTA*	*Rest of western Europe*	*Europe*	*Overseas developed*	*Developing countries*	*World*
Eastern Europe	Primary products	0.6	1.8	2.4[b]	1.2[b]	1.5[b]	1.3[a]	1.1	3.6[a]	2.3[b]	1.3
	Manufactures	1.5	2.5	2.6[a]	3.6[a]	2.4[a]	1.9[a]	1.9	2.9[a]	1.2	1.9
	Total	1.2	2.1	2.5[a]	1.9[a]	1.8[a]	1.6[a]	1.5	3.3[a]	1.4	1.7
Western Europe	Primary products	0.5	1.4	1.6	0.9	1.1	1.3	1.2	1.1	0.6	1.2
	Manufactures	2.3	2.5	2.5	4.0	2.1	1.8	2.2	1.7	0.9	1.9
	Total	1.8	2.2	2.2	2.5	1.9	1.7	1.9	1.6	0.9	1.7
EEC	Primary products	0.3[a]	1.7	1.9	1.0	0.9	1.5[a]	1.4	1.3[b]	0.6	1.4
	Manufactures	3.0[a]	2.6	3.1	3.3	2.1	1.8	2.2	2.5	1.0	2.0
	Total	2.2[a]	2.4	2.5	1.9	1.9	1.8	2.0	2.4	0.9	1.9
United Kingdom	Primary products	0.6[a]	1.0	1.0[a]	—	0.8[a]	0.8[a]	0.8	0.9[b]	0.2[b]	0.7
	Manufactures	1.8[a]	1.7	1.5	—	1.8	1.3	1.4	0.7	0.4	0.9
	Total	1.6[a]	1.6	1.5	—	1.6[b]	1.2[b]	1.3	0.7	0.4	0.9
Rest of EFTA	Primary products	0.2[a]	1.0	0.9	0.6	2.3[a]	1.3[a]	0.6	1.0[a]	0.9[a]	0.9
	Manufactures	1.7[a]	2.4	1.9	4.5[b]	2.9	2.1[a]	2.0	2.0	1.4	2.0
	Total	1.3[a]	1.9	1.5	2.3	2.8[b]	2.0[a]	1.5	1.8[b]	1.3	1.6
Rest of western Europe	Primary products	0.5[a]	1.1	1.1	1.3	1.2[a]	1.0[a]	0.8	1.1[a]	1.2[a]	0.9
	Manufactures	1.5[a]	2.3	1.6[b]	4.2[a]	5.2[a]	1.0[a]	1.9	3.3[a]	2.5[a]	2.2
	Total	1.1[a]	1.5	1.3[b]	2.1[b]	2.7[a]	1.0[a]	1.2	2.0[a]	2.1[a]	1.5
Europe	Primary products	0.6	1.5	1.6	1.0	1.2	1.3	1.1	1.4	1.0	1.2
	Manufactures	1.6	2.5	2.5	3.7	2.2	1.7	2.0	1.7	1.0	1.8
	Total	1.2	2.2	2.2	2.3	2.0	1.6	1.7	1.7	1.0	1.7
Overseas developed	Primary products	1.2[a]	0.5	0.8	−0.1	0.8[b]	0.6[b]	0.4	1.5	1.5	1.0
	Manufactures	4.1[a]	1.9	2.1	3.2	1.9	0.7	1.6	2.2	1.2	1.6
	Total	2.3[a]	1.2	1.5	1.2	1.5[b]	0.6	1.0	2.0	1.3	1.4
Developing countries	Primary products	0.6	1.2	1.3	0.9	1.3[b]	1.9	1.0	1.1	1.0	1.0
	Manufactures	1.0[a]	1.9	2.0	1.9	3.6[a]	2.5[a]	1.5	2.4	1.9	1.9
	Total	0.7[b]	1.3	1.4	1.1	1.6[a]	1.9	1.1	1.3	1.2	1.2
World	Primary products	0.6	1.2	1.4	0.6	1.2	1.3	0.9	1.2	1.1	1.1
	Manufactures	1.6	2.3	2.4	3.3	2.2	1.5	1.9	2.0	1.1	1.8
	Total	1.2	1.8	1.9	1.6	1.9	1.4	1.5	1.7	1.1	1.5

Source: As for table 2.1.

[a] 1955 share in world total less than 0.5 per cent.

[b] 1955 share less than one per cent but more than 0.5 per cent.

(neither proportion has increased much). This trade flow, chiefly the exchange of primary products for manufactures, remains far more important to the developing countries than to the developed.

In world trade in manufactures alone, two flows stand out as of major importance to the countries concerned. European intra-trade in manufactures amounts to about 11.5 per cent of European manufacturing output and has increased from 8.5 per cent in 1955; in the developing countries as a group, imports of manufactures from the developed world are 36 per cent of the developing countries' output of manufactures but this proportion has been falling.

The increasing role of Europe's intra-trade can also be traced in the high elasticity of intra-European imports of manufactures against growth of GDP—an elasticity of 2.0 against 1.7 for imports from the rest of the world (see table 2.2). Europe's intra-trade import elasticity for primary products, at 1.1, is also significantly higher than its elasticity for imports from outside (0.8).

TABLE 2.3

Percentage distribution of world trade

(Based on data at constant 1963 prices)

Exports to: *from:*	*Commodity class*	*Europe*		*Overseas developed*		*Developing countries*		*World*	
		1955	*1969*	*1955*	*1969*	*1955*	*1969*	*1955*	*1969*
Europe	Primary products	11.9	9.9	1.0	0.9	1.9	1.4	14.8	12.2
	Manufactures	18.4	29.3	5.2	5.5	10.3	7.1	33.9	41.9
	All commodities	30.3	39.2	6.2	6.4	12.2	8.5	48.7	54.1
Overseas developed	Primary products	5.5	2.7	3.6	3.4	1.7	1.7	10.8	7.8
	Manufactures	3.9	4.6	6.1	9.0	7.4	6.0	17.4	19.6
	All commodities	9.4	7.3	9.7	12.4	9.1	7.7	28.2	27.4
Developing countries	Primary products	9.8	7.4	6.9	4.9	3.2	2.2	19.9	14.5
	Manufactures	1.4	1.5	0.9	1.4	0.9	1.1	3.2	4.8
	All commodities	11.2	8.9	7.8	6.3	4.1	3.3	23.1	18.5
World	Primary products	27.2	20.0	11.5	9.2	6.8	5.3	45.5	34.5
	Manufactures	23.7	35.4	12.2	15.9	18.6	14.2	54.5	65.5
	All commodities	50.9	55.4	23.7	25.1	25.4	19.5	100.0	100.0

Source: As for table 2.1.

Trade in manufactures as per cent of manufacturing output (gross value)[a]

(Percentages based on data in 1963 prices)

	Intra-trade			*Extra-trade*					
				Imports[b]			*Exports*		
	1955	*1959*	*1969*	*1955*	*1959*	*1969*	*1955*	*1959*	*1969*
Europe	8.5	9.5	14.5	2.5	2.5	3.0	7.0	7.5	6.0
Overseas developed . . .	3.0	3.5	5.5	3.0	4.0	4.5	5.5	5.5	6.5
Developing countries . .	2.5	2.0	3.0	46.5	44.0	36.5	6.0	7.5	8.0
World	11.5	12.5	16.5	..	..	..	..	..	..

[a] Rounded to nearest half per cent.

[b] Expressed as a share of domestic consumption of manufactures (gross output minus exports plus imports) the shares remain unchanged, except for developing countries where they take the following values: 33.0, 32.5 and 28.5, respectively.

Merchandise trade as per cent of GDP[a]

(Percentages based on data in 1963 prices)

	Intra-trade		*Extra-trade*			
			Imports		*Exports*	
	1955	*1969*	*1955*	*1969*	*1955*	*1969*
Europe	5.5	9.5	3.5	4.0	3.5	3.5
Overseas developed .	1.5	3.0	2.5	3.0	3.0	4.0
Developing countries	2.0	2.5	11.0	12.0	10.0	11.0
World	7.5	[illegible]				..

[a] Rounded to nearest half per cent.

Ratio between volume growth rates for trade and GDP 1955 to 1969

P = Primary products M = Manufactures

	Intra-trade			*Extra-trade*					
				Imports			*Exports*		
	P	*M*	*Total*	*P*	*M*	*Total*	*P*	*M*	*Total*
Europe	1.1	2.0	1.7	0.8	1.7	1.1	1.1	1.2	1.1
Overseas developed . . .	1.5	2.2	2.0	1.1	1.8	1.5	0.8	1.5	1.3
Developing . . .	1.0	1.9	1.2	1.3	1.1	1.1	1.0	1.9	1.2
World	1.1	1.8	1.5						

TABLE 2.4

Percentage distribution of intra-European trade

(Based on data at 1963 prices)

Exports to:	Commodity class	Eastern Europe		Western Europe		EEC		United Kingdom		Rest of EFTA		Rest of western Europe		Total Europe	
		1955	1969	1955	1969	1955	1969	1955	1969	1955	1969	1955	1969	1955	1969
Eastern Europe	Primary products	8.0	4.2	3.4	2.9	1.1	1.5	0.8	0.3	0.8	0.6	0.7	0.5	11.4	7.1
	Manufactures	9.8	11.2	1.6	2.0	0.4	0.7	0.2	0.2	0.4	0.4	0.6	0.7	11.4	13.2
	Total	17.8	15.5	5.0	4.9	1.5	2.2	1.0	0.6	1.3	1.0	1.3	1.2	22.8	20.3
Western Europe	Primary products	1.7	0.7	26.3	17.5	14.0	11.4	6.3	2.5	4.6	2.6	1.4	1.0	28.0	18.2
	Manufactures	2.4	4.3	46.8	57.2	23.3	34.0	4.1	4.1	13.1	13.0	6.3	6.0	49.2	61.5
	Total	4.1	5.0	73.1	74.7	37.3	45.4	10.4	6.6	17.6	15.6	7.7	7.0	77.2	79.7
EEC	Primary products	0.6	0.3	13.5	10.8	8.0	8.6	2.2	0.9	2.8	1.3	0.5	0.5	14.1	11.1
	Manufactures	1.0	2.3	29.8	40.1	15.3	26.6	2.7	2.3	8.4	7.6	3.4	3.5	30.8	42.4
	Total	1.6	2.6	43.3	50.9	23.3	34.8	4.9	3.2	11.2	8.9	3.9	4.0	44.9	53.5
United Kingdom	Primary products	0.1	—	2.0	1.0	0.8	0.4	—	—	0.7	0.4	0.5	0.2	2.1	1.0
	Manufactures	0.3	0.5	7.6	5.9	3.4	2.8	—	—	2.4	1.8	1.8	1.3	7.9	6.4
	Total	0.4	0.5	9.6	6.9	4.2	3.2	—	—	3.1	2.2	2.3	1.5	10.0	7.4
Rest of EFTA	Primary products	0.4	0.1	6.6	3.4	3.3	1.7	2.5	0.9	0.6	0.6	0.2	0.2	7.0	3.5
	Manufactures	0.5	0.8	7.7	2.2	3.6	3.7	1.0	1.3	2.2	3.1	0.9	1.1	8.2	10.0
	Total	0.9	0.9	14.3	12.6	6.9	5.4	3.5	2.2	2.8	3.7	1.1	1.3	15.2	13.5
Rest of western Europe	Primary products	0.6	0.3	4.2	2.3	1.9	1.2	1.6	0.7	0.5	0.3	0.2	0.1	4.8	2.6
	Manufactures	0.6	0.7	1.7	2.0	1.0	0.9	0.4	0.5	0.1	0.5	0.2	0.1	2.3	2.7
	Total	1.2	1.0	5.9	4.3	2.9	2.0	2.0	1.2	0.6	0.8	0.4	0.3	7.1	5.3
Total Europe	Primary products	9.7	4.9	29.7	20.4	15.1	12.9	7.1	2.8	5.4	3.2	2.1	1.5	39.4	25.3
	Manufactures	12.2	15.5	48.4	59.2	23.7	34.7	4.3	4.3	13.5	13.4	6.9	6.7	60.6	74.7
	Total	21.9	20.5	78.1	79.5	38.8	47.6	11.4	7.2	18.9	16.6	9.0	8.2	100.0	100.0

Source: As for table 2.1.

Share of major areas in total trade of each area
(Percentages based on data at 1963 prices)

Trade partner	Year	Reporting area: Europe Imports	Europe Exports	Overseas developed Imports	Overseas developed Exports	Developing Imports	Developing Exports	World Imports	World Exports
Europe	1955	60	62	26	23	48	48	49	51
	1969	71	73	25	27	43	48	54	55
Overseas developed	1955	18	13	41	35	36	34	28	24
	1969	13	12	49	45	40	34	27	25
Developing	1955	22	25	33	32	16	18	23	25
	1969	16	15	26	28	17	18	19	20
World	1955	100	100	100	100	100	100	100	100
	1969	100	100	100	100	100	100	100	100

Notwithstanding the increasing dependence of European countries on trade among themselves, Europe takes half the total exports of developing countries (the proportion was the same in 1969 as in 1955) and supplies over 40 per cent of developing countries imports (this proportion has however fallen, the overseas developed countries having increased their market share in the developing world). And trade with Europe represented about a quarter of the trade (both exports and imports) of the overseas developed countries.

The changing patterns of intra-European trade

Intra-European trade grew by nearly 10 per cent a year (at 1963 prices) between 1955 and 1969—11 per cent in manufactured goods, but only 6 per cent in primary products. Within this over-all expansion, all the trade flows between the principal component areas, both in primary products and in manufactures, increased in volume although at very different rates (see table 2.1).

Among the major trade flows within Europe, those within the sub-regional economic groupings are of special interest. First, *trade among the EEC countries* increased (at constant prices) by nearly 13 per cent a year—rather more for manufactures, but even in primary products by nearly 10 per cent a year. Indeed, one of the fastest rates of expansion was that of intra-EEC trade in foodstuffs (SITC 0 and 1) which increased by 11.5 per cent a year in volume and accounted by 1969 for 40 per cent of total intra-European trade in foodstuffs (against 22 per cent in 1955). In total, intra-EEC trade represented in 1969 over one-third of total intra-European trade, having increased from under a quarter of the total in 1955 (see table 2.4).

Secondly, *trade among the east European countries* (including the Soviet Union) increased by just over 8 per cent a year in volume—again rather faster in manufactures (over 10 per cent) than in primary products (5 per cent a year). Since these growth rates are somewhat less, both for manufactures and primary products, than the growth rates of total intra-European trade, the share of intra-east European trade in that total was slightly reduced (from 18 per cent in 1955 to 15.5 per cent in 1969).

Thirdly, *trade among the EFTA countries* increased less fast than total intra-European trade—its share of the total falling from about 9.5 per cent to 8 per cent. This was because of the relatively slow growth of the United Kingdom's trade with the rest of EFTA, as with most areas.[60] But among the other members of EFTA,[61] intra-trade increased by 11.5 per cent a year, almost as much as intra-EEC trade. A major reason was the rapid development of trade among the Nordic countries, in which industrial co-operation and sub-contracting played a significant part.[62]

Taken together, the intra-trade of the three groupings—EEC, eastern Europe and EFTA—accounted for 50 per cent of total intra-European trade in 1955. By 1969 the proportion had increased to 58 per cent.

These developments in the intra-trade of the three sub-regional groupings must be seen in the light of their interdependence at the beginning of the period (see table below).

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[60] The United Kingdom's exports to eastern Europe, however, grew particularly fast between 1955 and 1969, by 12 per cent a year in volume (see table 2.1).

[61] Excluding Finland, which is not included among the EFTA countries in the statistical sources used here.

[62] See *Economic Bulletin for Europe*, vol. 23, No. 2 (1972) part A, chap. 4. Of the total exports of Finland, Denmark, Norway and Sweden, the proportion going to the other three countries rose from 16 per cent in 1959 to 25 per cent in 1969.

Intra-trade as percentage of total exports

	All products 1955	All products 1969	*Primary products* 1955	*Primary products* 1969	*Manufactures* 1955	*Manufactures* 1969
Europe	62	73	81	82	54	70
Eastern Europe	61	61	64	48	60	68
Western Europe	56	66	72	79	49	63
EEC	33	48	44	63	29	45
EFTA	18	24	31	30	14	23
EFTA (excluding United Kingdom)	14	21	8	15	18	22

NOTE.—The larger the region the greater the proportion of intra-trade.

East-west European trade. The share of western Europe in east European exports rose from 17 per cent in 1955 to 19 per cent in 1969. On the import side the increase was more marked; of eastern Europe's imports, 15 per cent came from western Europe in 1955 but the proportion increased to 21 per cent in 1969. East European exports to western Europe increased by some 9 per cent a year, while east European imports from western Europe rose by 11 per cent. The rates of expansion were substantially greater in manufactured goods; west European exports of manufactures to eastern Europe rose by as much as 14 per cent a year—one of the most rapid flows in the intra-European trade pattern. East-west European trade represents only 5 per cent of total intra-European trade, a proportion that has not changed much since 1955.

Trade and production trends

The growth of the various trade flows in Europe must also be considered in relation to the rates of growth of the economies. This is most conveniently analysed in terms of import elasticities against GDP growth (ratio of import growth in volume to GDP growth—see table 2.2). Over-all, the import elasticity for Europe as a whole in 1955–1969, taking imports from all areas of the world, was 1.5. The elasticities are higher for intra-European trade (1.7), for intra-EEC trade (2.5) and for intra-EFTA trade (2.1). The corresponding elasticities for manufactured goods alone are higher still. In eastern Europe the over-all import elasticity is about the same (1.2) for total imports as for intra-trade and for imports from west European countries other than EEC and the United Kingdom. Among the high elasticities (2.5) is that for the EEC's imports from eastern Europe (of EEC imports from all sources, the proportion from eastern Europe rose from 2 to 3 per cent; in primary products alone from 3 to 5.5 per cent); the elasticity for eastern Europe's imports from the EEC (2.2, for total imports but 3.0 for manufactures) is also exceptionally high.

Import elasticities also throw some light on the controversial question of the extent to which the formation of the economic groupings in Europe can be regarded as creating new channels for international trade and division of labour, and how far they have been accompanied by diversion of trade from non-members.

The most significant fact is that in all three economic groupings—the EEC, EFTA and eastern Europe—the elasticities for *manufactures* imported from outside the group are almost all greater than 1 (table 2.2). This means that non-members have in all cases gained an increased share of the total market for manufactures (including domestic production). The same result is shown by the table (foot of page) relating trade in manufactures to manufacturing output.

Thus in both EEC and EFTA, the share of total imports in each market has greatly increased—by similar proportions in the two groups. And in EEC, although not in EFTA, the greatest part of this increasing share of imports, at the expense of the share of domestic production, has been taken up by other member countries. But the shares of non-members have also risen, particularly strongly in EFTA, and less so, but significantly, in EEC. The rise in the market share of total imports, in both EEC and EFTA, may be taken as a measure of over-all "trade creation" at the expense of domestic production, no doubt largely associated with the fall in the "average" level of tariffs and other liberalizing measures—some preferential, some non-discriminating. The fact that in EEC the share of intra-trade among members increased so much more than trade with non-members is some measure of the preferential effect of the progressive abolition of the internal tariff. But it must be remembered that during the period covered, the EEC's external tariff was also reduced. This was not only because of the small general tariff reductions effected in GATT negotiations [63] but may also

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[63] Only modest reductions were effected by the "Dillon Round" of 1960–1962. The much more substantial reductions of the Kennedy Round began to come into effect in 1969.

Imports of manufactures as a percentage[a] of consumption[b]

	Trade with world		*Intra-trade*		*Trade with rest of Europe*		*Trade with rest of world*	
	1955	*1969*	*1955*	*1969*	*1955*	*1969*	*1955*	*1969*
Europe	11.5	18.0	9.0	15.0	. .	. .	2.5	3.0
Eastern Europe[c]	5.5	7.0	4.0	5.0	1.0	2.0	0.5	0.5
Western Europe	15.0	27.5	10.5	21.5	0.5	0.5	4.0	5.5
EEC	12.5	26.5	6.5	16.5	3.5	5.0	2.5	5.0
EFTA	15.0	28.0	3.5	7.5	7.5	14.0	4.0	6.5
of which:								
United Kingdom	9.0	17.5	. .	. .	4.0	9.5	5.0	8.0
Rest of world	26.5	41.5	4.0	8.5	19.0	28.0	3.5	5.0
Rest of western Europe	30.0	32.0	0.5	0.5	20.5	26.0	9.0	5.5

[a] Rounded to nearest half per cent.

[b] Gross output minus exports plus imports.

[c] The average for eastern Europe is obviously highly influenced by the Soviet Union which in 1969 accounted for about 70 per cent of manufacturing output in the area and for about 40 per cent of the area's total trade in manufactures. Rough estimates for import shares in the Soviet Union and the rest of eastern Europe separately are:

	Imports	
	1955	*1969*
Soviet Union	2.5	3.0
Rest of eastern Europe	6.0	11.5

Imports of manufactures as percentage of consumption in EEC and EFTA[a]

Area of origin of imports	*EEC*				*EFTA*			
	1955	*1959*	*1965*	*1969*	*1955*	*1959*	*1965*	*1969*
World	12.5	17.5	19.5	26.5	15.0	17.5	23.0	28.0
Europe	10.0	14.0	16.0	22.0	11.0	13.0	17.5	21.5
Western Europe	10.0	13.5	15.5	21.5	10.5	12.5	17.0	21.0
EEC	6.5	9.0	12.0	16.5	7.0	8.5	10.5	12.0
EFTA	3.0	4.0	3.5	4.0	3.5	4.0	5.5	7.5

[a] Rounded to nearest half per cent.

be due to the net effect of the averaging of the external tariffs of EEC members; at the same time general progress in the liberalization of trade restrictions continued. The conclusion appears to be that in EEC the potential diversion of trade from non-members was on balance more than offset by the trend towards a general liberalization of international trade. In EFTA, the internal trade creation associated with preferences may have been more than outweighed by the consequences of general liberalization resulting in external trade creation.[64] Moreover the links, not only in trade but also in industrial integration, were probably stronger to begin with among the EEC countries. In both economic groupings, however, cases of trade diversion can be found in individual product groups.

The analysis so far relates to the whole period 1955–1969. The formation of the EEC and of EFTA [65] produced—especially in EEC—a significant acceleration in the growth of intra-trade during this period (see table at head of page).

The figures of trade in primary products tell a somewhat different story. EEC import elasticities for imports of primary products from non-members is only about 1, suggesting very little if any external trade creation, while for intra-trade the elasticity (nearly 2) indicates substantial internal trade creation. For EFTA, the external import elasticities are lower still.

For eastern Europe, the development has been quite different. The degree of interdependence among the members of the group was much greater in 1955 than in the western groupings, but on balance has been somewhat reduced both in primary products and manufactures.

That the preferential effects of the western trade groupings should have occurred simultaneously with a general reduction of trade barriers together with a technology-induced intensification of industrial co-operation, is of the utmost importance for assessing future prospects for a general, and not only intra-group, expansion of European trade. This tendency should now be reinforced by the application of the Kennedy Round tariff reductions, while the direct effects of the abolition of internal tariffs should be diminishing (although the less direct effects on industrial integration of the Common Market are not likely to have been exhausted). On this account, external trade creation should continue at least for a time. The consequences of the prospective enlargement of EEC on the trade of non-members are not clearly predictable. But the lesson of the experience of recent years is that, so long as general economic growth persists, and if a new impetus can be given to a *general* reduction of trade barriers, the probable intensification of trade links among the future members of the larger EEC can still be accompanied by continued growth of their trade relations with non-member countries.

(iii) Balance-of-payments developments and international liquidity in the market economies

Major trends in the international transactions of the market economies may be summarized as follows:

(*a*) Western Europe was on balance in increasing surplus on current account—the result of a growing surplus in invisible transactions offsetting a regular deficit on merchandise trade.

(*b*) The increasing outflow of official aid and private capital from western Europe to developing countries exceeded the outflow of real resources (expressed by the current surplus); it was in part compensated by an increasing inflow of private capital, especially from the United States.

(*c*) Financial relationships between western Europe and the United States underwent important changes. While the inflow of United States capital into western Europe, superseding the economic and military aid of

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[64] It is recognized that the measurement of trade creation and trade diversion as a result of custom unions has been extensively researched, often with differing results. The conclusions above for EEC are broadly in agreement with those found by a recent Yale Study (Edwin M. Truman "The Impact of the EEC on trade and production of manufactured products: the first decade", unpublished). This study, for the period 1958-1968, suggests that in total non-members gains in share of the EEC market for manufactures as a result of over-all trade liberalization were about offset by their losses of share as a result of preferences. See also EFTA, *The Effects of EFTA* (Geneva 1969), which, by a different approach and for the period up to 1965, appear to show more trade diversion than is suggested above. For a general review of the literature see J. W. Williamson and A. Bottrell, "The impact of Customs Unions on Trade in Manufactures", *Oxford Economic Papers*, November 1971.

[65] The general tariff adjustments under the Treaty of Rome and in EFTA came into effect in mid-1960.

TABLE 2.5

Current account (goods, services and private transfers) of western Europe and the United States
(Annual averages)

Country	*1950–1958*		*1959–1965*		*1966–1969*	
	Millions of US dollars	*As a percentage of GNP*	*Millions of US dollars*	*As a percentage of GNP*	*Millions of US dollars*	*As a percentage of GNP*
Federal Republic of Germany	817	2.1	945	1.1	2 684	2.0
France (with non-franc area)	−303	−0.7	670	0.9	−772	−0.6
Italy	−63	0.3	637	1.4	2 421	3.3
United Kingdom	348	0.7	234	0.3	413	0.4
Other industrial western Europe	261	0.5	−277	−0.3	−140	−0.1
Industrial western Europe	1 060	0.5	2 209	0.6	4 606	0.8
Southern Europe	−488[a]	−1.7[a]	−464	−1.3	−828	−1.4
Total western Europe	572	0.2	1 745	0.4	3 778	0.6
United States	2 165	0.6	4 484	0.8	2 582	0.3

Source: The ECE Region in Figures, tables 36 and 37.

[a] Including data for Malta and Spain for 1954–1958, and GNP data for Yugoslavia for 1956–1958.

the early postwar years, was mainly in the form of direct industrial investment, there was a large reverse flow of portfolio and short-term capital. To this extent, western Europe was borrowing long and lending short.

(*d*) The accumulation of dollar liabilities by the central banks of western Europe was a major source of the increase of international liquidity, especially in the first half of the 1960s. In 1965–1968, international co-operation both within the IMF framework and between central banks, assumed greater importance.

Current account

Western Europe's surplus on current account increased from $0.6 billion a year in 1950–1958 to $3.8 billion a year in 1966–1969 (table 2.5).[66] The reason for the rising surplus is the substantial increase over the same period in the surplus on invisibles, from $2.9 billion a year to $6.7 billion over the same period. This much more than offset an increase in the region's trade deficit which rose from $2.3 billion in 1950–1958 to $3.4 billion in 1959–1965 although declining to $2.9 billion in 1966–1969.

The current account surplus of *industrial countries* alone increased from $1.1 billion a year in 1950–1958 to $4.6 billion in 1966–1969 while the deficit of the *south European countries* increased from $0.5 billion in 1950–1958 to $0.8 billion in 1966–1969. Of the four larger countries, the Federal Republic of Germany, Italy (except in 1950–1958) and the United Kingdom have been in surplus in all three periods—the Italian and Federal Republic surpluses rising to 2–3 per cent of GNP. The French current account (with the non-franc area) fluctuated from deficits in the 1950s to surplus in the early 1960s, after the 1958 devaluations, but reverted to deficit in 1966–1969 (especially in 1968 and 1969, although returning to a surplus again in 1970).[67] Among the smaller industrial countries, only Belgium and Switzerland were in surplus for most of the 20-year period (and the Netherlands until the later 1960s). Large deficits were experienced for most of the period by the Nordic countries. In southern Europe, current deficits were general until Portugal emerged into surplus in the early 1960s.

For most countries the typical pattern that prevailed throughout the period was a trade deficit, partly or more than offset by a surplus on invisibles. The only exceptions were the Federal Republic of Germany, with a surplus on trade account in all three sub-periods which more than offset the deficit on invisibles and Belgium-Luxembourg with a surplus on both trade and invisibles. France had a trade surplus in 1959–1965, Italy in 1966–1969, and Finland in 1950–1958.

All the industrial countries of western Europe except the Federal Republic of Germany and France had a surplus on invisibles in all three periods. Particularly significant was the growth in the invisible surplus of Italy, Norway and the United Kingdom. In Italy it was mainly accounted for by tourism and emigrant remittances, in Norway by earnings on shipping. In the United Kingdom, it reflected mainly an increase in the net receipts on investment income. The Federal Republic of Germany's deficit on invisibles increased from $0.05 billion in 1950–1958 to $2.2 billion in 1966–1969, when it consisted of large net payments on travel, remittances by foreign workers, and net payments on investment income.

Among the most striking changes was the rapid growth of net invisible receipts in the south European countries; their combined surplus increased from $0.3

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[66] The current account as defined here covers transactions in goods and services and private transfers; it excludes official transfers such as grant aid to developing countries.

[67] Transactions of Metropolitan France with the rest of the franc area, for which data are available only for recent years, have yielded moderate current surpluses.

Table 2.6

The United States balance of payments with western Europe

(Million dollars)

	1946	1947	Annual average 1948–1955	Annual average 1956–1958	1959	Annual average 1960–1965	Annual average 1966–1969	1970
I. (*a*) Current account	3 771	5 027	989	119	−1 862	1 146	−542	−91
of which:								
Trade balance	3 472	4 892	2 002	2 223	207	2 814	1 317	2 899
Military transactions[a]	−16	−164	−771	−1 640	−1 489	−1 101	−814	−1 175
Other invisibles (excluding (*b*))	315	299	−242	−464	−580	−567	−1 045	−1 815
(*b*) Government grants (excluding military grants)	−382	−672	−2 041	−375	−311	−169	−38	−29
Total (*a*) + (*b*)	3 389	4 355	−1 052	−256	−2 173	977	−580	−120
II. Net outflow of United States long-term capital	−2 272	−3 746	−299	−699	72	−1 109	−1 313	−2 027
(*a*) United States private	−164	−78	−127	−545	−477	−1 359	−1 135	−2 229
of which:								
United States direct investment	−22	−43	−60	−322	−484	−1 057	−1 376	−1 904
(*b*) United States Government	−2 108	−3 668	−172	−154	549	250	−178	202
III. = I + II. Transfer gap	1 117	609	−1 351	−955	−2 101	−132	−1 893	−2 147
Financing of the transfer gap:								
(*a*) Foreign long-term capital	−113	−184	107	255	559	320	2 661	2 626
(*b*) United States liquid liabilities to foreigners	−398	−787	554	548	1 362	645	2 401	933
(*c*) Short-term		3	−1	24	128	−173	28	906
(*d*) Official reserves	−368	−1 447	141	726	829	765	−150	2 357
of which: Gold	(−368)	(−1 447)	(141)	(726)	(829)	(893)	(335)	(205)
(*e*) Net errors and omissions	−238	1 806	550	−598	−777	−1 425	−3 047	−4 675

Sources: United States Department of Commerce: Balance of Payments, *Statistical Supplement*, Revised edition (1963); *Survey of Current Business*, various issues.

[a] Military transactions for cash or credit. These exclude military goods and services transferred under grants amounting to about $1½ billion a year through the 1950s and subsequently diminishing.

billion in 1950–1958 to $3.0 billion in 1966–1969. This was mainly due to increases in net earnings from tourism and emigrants' remittances; in Greece there was also a significant increase in net earnings from shipping. Invisible earnings were an important means of reducing the balance-of-payments constraint on growth in these countries.

In the United States the pattern was different: a large trade surplus more than offset a relatively small deficit on invisibles in 1950–1958 and 1959–1965; in 1966–1969 there was also a small surplus on the invisibles account. The United States had a surplus on current account in all three periods—larger than that of western Europe as a whole until the late 1960s. Rising from $2.2 billion in 1950–1958 to $4.5 billion in 1959–1965, it declined to $2.6 billion in 1966–1969, in the wake of the inflation that developed in the United States in the later 1960s.[68]

To a large extent, developments in the balance of payments of the United States reflected transactions with western Europe. After the massive surpluses of the early post-war years, offset by economic and military aid, the United States balance with western Europe fluctuated around a more moderate average surplus, with substantial deficits in some years particularly 1959; it fell into deficit in 1966 to 1970. These changes were due mainly to changes in the trade balance; the United States deficit on invisible transactions with western Europe was steadily increasing (table 2.6).

Industrial western Europe's current account surplus increased from 0.5 per cent of GNP in 1950-1958 to 0.6 per cent in 1959–1965 and 0.8 per cent in 1966–1969 (table 2.5), the area therefore being a net exporter of real resources throughout the two decades. The net import of resources by the countries of southern Europe declined from 1.7 per cent of GNP in 1950–1958 to between 1.3 and 1.4 per cent in the 1960s. The current surplus of the United States increased from 0.6 per cent of its GNP in 1950–1958 to 0.8 per cent in 1959–1965 but declined to 0.3 per cent in 1966–1969.

While the share of GNP exported to the rest of the world by the industrial countries thus increased this tended to be concentrated in an increasingly small number of countries. In 1950–1958 eight of the 14 industrial countries of western Europe recorded a surplus; this number fell to seven in 1959–1965 and to six in 1966–1969. While fluctuations in current accounts are to be expected, a situation in which mature and rich countries are persistently in deficit is unlikely to be compatible with international equilibrium, given the general objective of increasing the transfer of real resources to the developing countries. If countries with a persistent deficit on current account are exporting capital, they are indirectly helping to finance the export of real resources from other countries which are in current surplus.

Capital movements

Against this background, the flow of financial resources (grants, loans and direct investment) to the developing world, from 12 countries of western Europe, increased

TABLE 2.7

The flow of financial resources to developing countries from selected west European countries, Canada and the United States

(Annual averages)

Country	*1950–1958*		*1959–1965*		*1966–1969*	
	Million current dollars	*Percentage of GNP*	*Million current dollars*	*Percentage of GNP*	*Million current dollars*	*Percentage of GNP*
Belgium	85	0.87[c]	170	1.22	211	1.00
Federal Republic of Germany	234	0.58	705	0.79	1 408	1.05
France	1 206[a]	2.15[a]	1 309	1.71	1 531	1.25
Italy	82	0.35[d]	275	0.61	579	0.79
Netherlands	208[a]	2.29[a]	180	1.28	282	1.16
Austria	1[a]	0.02[a]	19	0.26	63	0.56
Denmark	..	..	24[b]	0.31[b]	70	0.56
Norway	..	..	19	0.37	45	0.52
Portugal	42[a]	2.01[a]	40	1.36	66	1.35
Sweden	22[a]	0.21[a]	53	0.34	142	0.57
Switzerland	95[a]	1.33[a]	163	1.52	151	0.90
United Kingdom	704[a]	1.14[a]	863	1.04	886	0.82
Total of countries shown	2 679	1.31	3 820	1.03	5 434	0.97
United States	2 376	0.62	4 399	0.76	5 224	0.62
Canada	77	0.29	123	0.31	303	0.50

Sources: OECD, *The flow of financial resources to less developed countries*, 1956–1963, Paris 1964; and OECD, *Development Assistance* Paris 1970; OECD, *National Accounts (1953–1969)*; United Nations, *Yearbook of National Account Statistics*, 1969; and national statistics.

[a] 1956–1958. [b] 1960–1965. [c] GNP data for 1953–1958. [d] GNP data for 1951–1958.

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[68] For a fuller account of changes in the United States current account by regions, see *Economic Bulletin for Europe*, vol. 23, No. 2, 1972, part A.

from $2.7 billion a year in 1950–1958 to $5.4 billion in 1966–1969 (table 2.7).[69] This compares with an outflow from the United States of $2.4 billion in 1950–1958 and $5.2 billion in 1966–1969. Of the increase in the flow from North America and western Europe together, official flows increased most, from $2.8 billion to $6.2 billion, while private flows rose from $2.3 billion to $4.4 billion. From western Europe as a whole, however, private investment rose most, mainly from the Federal Republic of Germany and from Italy; in most other countries the increase was mainly in official flows. As a proportion of GNP, France recorded the largest outflow (over 2 per cent in 1956–1958, falling to 1.3 per cent in 1968–1969).

In the 1960s the total financial flow from most countries of western Europe to the developing countries exceeded their net export of real resources to the rest of the world (their current surpluses); the exceptions are the Federal Republic of Germany, Italy, and Switzerland (in 1966–1969).[70] The share of this flow in the area's GNP declined from about 1.1 per cent in 1950–1968 to 0.9 per cent in 1966–1969. To the extent that these data are comparable, they imply that throughout the period industrial western Europe's flow of financial resources to the less developed countries was not financed entirely by an excess of the region's savings over its domestic investment but also through a net inflow of a long-term capital from the rest of the world, especially the United States. Western Europe acted in this sense as an intermediary through which foreign saving was transferred to the rest of the world.

Most countries of western Europe remained net importers of private long-term capital throughout the post-war period. Only the United Kingdom remained a net exporter of private long-term capital and this declined gradually. In 1966–1969 the Federal Republic of Germany and Italy emerged as major net exporters of private long-term capital at an annual average of $1.1 billion and $0.4 billion respectively compared with $0.15 billion from the United Kingdom in the same period. While the outflow from the United Kingdom was mainly direct investment, for the Federal Republic of Germany and Italy portfolio investment and long-term credits were most important.

The inflow of long-term capital to western Europe originated mainly in the United States. The large grants and loans under the European Recovery Programme ended in the early 1950s, when United States private investment was still very small. The flow of private investments (mainly direct investments) increased sharply from the late 1950s, rising to over $1 billion a year in the 1960s (see table 2.6). This flow from the United States to western Europe constituted the largest change in the pattern of international direct investment in the last two decades.[71] The investment has been largely linked to the transfer of technology from the United States to western Europe, and has been concentrated mainly in chemicals, machinery, especially computers, and transport equipment, since United States enterprises dominate certain research-intensive branches. United States direct investment in western Europe was mainly intended to serve the local European markets which absorbed a substantial share of total sales. The decisions to make direct investments rather than exports were partly determined by the possibility of reducing transport costs, avoiding tariff barriers, and benefiting from lower labour costs, although United States direct investment in western Europe did not concentrate in the industrial sectors with the highest tariffs nor in countries with the most abundant and cheap labour.

To some extent United States direct investment in western Europe was offset by west European purchases of shares and bonds of the American corporations investing in the region. These grew considerably in the later 1960s, partly in response to United States measures intended to limit the net outflow of capital. Thus, the United States corporations provided another channel for investment of European savings within western Europe. The net outflow of west European "long-term" private capital to the United States, which was relatively small in the 1950s, increased from an annual average of $320 million in 1960–1965 to $2.7 billion in 1966–1969, largely portfolio investment.

A significant development in the field of short-term capital movements in the 1960s was the fast growth of the Euro-currency market, consisting largely of Euro-dollars,[72] which followed the return to convertibility in 1958. The net volume of Euro-currencies handled by the market increased from about $7 billion at the end of September 1963 to $57 billion at the end of 1970. The development of the market facilitated the international mobility of short-term capital, impelled both by interest rates differentials and, at times, by speculation on parity changes. While these large movements of funds may sometimes have helped to finance balance-of-payments disequilibria they may also have increased the difficulties of reconciling domestic and balance-of-payments objectives. In 1969 the United States took measures designed to limit the borrowing of United States banks from the market, while several countries of western Europe took measures to prevent the market from attracting short-term capital at the expense of their external position.[73]

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[69] For data on the flows from eastern Europe to developing countries, see *The ECE Region in Figures*, table 39.

[70] The data relating to capital flows to developing countries for the period 1950–1958 are not strictly comparable with those for the current account for the same years since they do not always cover the same period. The data for France cover flows to both franc and non-franc developing countries and are not comparable with the French current account given in table 2.5, which relates only to transactions with countries outside the franc area.

[71] For a fuller discussion of foreign industrial investment in western Europe, see *Economic Bulletin for Europe*, vol. 19, No. 1, 1967.

[72] A Euro-dollar is a dollar "that has been acquired by a bank outside the United States and used directly or after conversion into another currency for lending to a non-bank customer, perhaps after one or more re-deposits from one bank to another". *Bank for International Settlements, Thirty-fourth Annual Report*, Basle, 8 June 1964, p. 127.

[73] See *Economic Bulletin for Europe*, vol. 22, No. 1, 1971.

TABLE 2.8

Changes in official monetary reserves

	Annual average changes		Million dollars			Position at end 1969
	1951–1959	1960–1964	1965–1968	1969	1970 (prov.)	
Total, world	1 038	2 358	2 049	835	14 260	78 191
of which: western Europe	1 365	2 773	910	–2 479	11 298	35 874
Gold, world	500	592	–475	185	1 935	39 125
of which: western Europe	915	1 326	338	–755	–555	21 039
Foreign exchange, world	350	1 586	1 941	412	12 100	32 340
of which: western Europe	367	1 092	257	–197	10 028	12 573
US external liquid liabilities, world	813	1 060	–735	–490	8 080	11 980
of which: western Europe	666	310	–555	–1 140	7 190	5 860
US non-marketable liabilities, world	—	70	1 165	–960	–190	4 100
of which: western Europe	—	. .	. .	. .	. .	. .
UK official borrowing from central monetary institutions, world	—	121	1 186	—1 604	–2 787	3 744
of which: western Europe	—	. . [a]	. . [a]	. . [a]	. . [a]	. . [a]
Central monetary institutions' sterling reserves, world	–147	58	-547	824	511	5 151
of which: western Europe	–20	90[a]	352[a]	–826[a]	. .	1 310[a]
Other, world[b]	–316	277	872	2 642	6 486	7 365
of which: western Europe[b]	–279	692[c]	460[c]	1 769[c]	2 838[c]	5 403[c]
Fund reserve positions, world	188	181	583	238	971	6 726
of which: western Europe	83	355	315	–1 527	494	2 262
Special drawing rights, world	—	—	—	—	3 124	—
of which: western Europe	—	—	—	—	1 331	—

Source: International Monetary Fund, International Financial Statistics.

[a] Central Monetary Institutions Sterling Reserves include United Kingdom official borrowing from Central Monetary institutions with sterling counterpart but exclude Foreign Currency Deposits.

[b] Including United States non-marketable liabilities.

[c] Obtained as a difference.

Linked to the growth of the Euro-currency market was the rapid increase of United States external liquid liabilities, which provided an important source of financing of the United States deficit. They rose from $9 billion in 1950 to $42 billion in 1969. While in 1950 and 1959 more than half of the liabilities were held by monetary authorities and governments, in 1969 their share was about one-quarter.

The investment position of the United States vis-à-vis western Europe thus changed significantly. In 1950, United States assets in western Europe ($12 billion) exceeded United States liabilities to the region ($9 billion), but in the 1950s the United States became a net debtor to western Europe, its net indebtedness increasing throughout the 1960s. United States assets in western Europe increased to $18 billion in 1958, and $41 billion in 1969, while its liabilities increased to $20 billion in 1958 and $55 billion in 1969. While the growth of United States assets in western Europe was mainly in private direct investment, the increased liabilities were mainly liquid liabilities and, to a lesser extent, United States securities purchased by Europeans. The investments of European savings by United States companies in Europe partly reflected different liquidity preferences, west Europeans preferring to borrow long term and lend short term. The larger size, relatively bigger research expenditure and higher self-financing ratios of United States corporations have also been cited as facilitating their expansion in western Europe through direct investment, while the relative efficiency and size of the United States capital market may have played some role in attracting west European portfolio investment.

Official monetary reserves and international liquidity

The growth of United States external liquid liabilities was a major source of the post-war increase of international liquidity, accounting for 40 per cent of the total increase of $29 billion between 1951 and 1969 (see table 2.8). The main element was an increase of western Europe's official reserves by $26 billion over the same period. The official reserves of the United States fell from $24 billion in 1951 to $17 billion in 1969, largely due to conversions of United States dollar liquid liabilities into gold by the central banks of western Europe.

The annual average increase in international liquidity was $1 billion in 1951–1959, $2.4 billion in 1960–1964, $2.0 billion in 1965–1968 and $0.8 billion in 1969. In 1951–1959 the increase of gold holdings accounted for about half of the total. The increase of the foreign exchange component was the net effect of a rise in United States external liquid liabilities and a decline in sterling liabilities. In 1960–1964 about two-thirds of the increase was in foreign exchange, mainly United States external liquid liabilities. In 1965–1968 the increase in liquidity was mainly the result of international monetary co-operation. It was almost entirely accounted for by foreign exchange arising from large purchases of United States non-marketable liabilities by foreign central banks (the "Roosa bonds") and United Kingdom official borrowing from central monetary institutions. Both these sets of transactions were partly reversed in 1969. By contrast with an annual average decline of $0.5 billion in 1965–1968, the official sterling reserves increased by $0.8 billion in 1969—an increase in holdings by the overseas sterling area more than offsetting declines elsewhere. (This followed agreement on a $2 billion medium-term standby facility to the United Kingdom by various central banks and the Bank for International Settlements to counterbalance fluctuations in the sterling balances of sterling area countries.) In 1970 the supply of international liquidity was greatly increased: total official reserves rose by $14 billion ($11 billion in western Europe), half as much as in the whole of the preceding two decades. The first allocation of Special Drawing Rights in 1970 amounted to $3.1 billion. But the largest part of the increase in liquidity came from an exceptional rise (of $12 billion) in the foreign exchange component of reserves, mainly of dollar balances in western Europe. A rather more even distribution of reserves within western Europe by the end of the period was associated with the over-all increase in the supply of international liquidity.[74]

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[74] For example, the mean deviation of reserves in proportion to imports, between countries (shown in the *ECE Region in Figures*, table 41) declined fairly steadily from 34 in 1951–1958 to 17 in 1970.

Statistical note

1. *World output and trade growth 1913–1969*

Pre-war and post-war volume indices of world manufacturing output and trade in primary products and manufactures have been published by the secretariats of the League of Nations and the United Nations. A pre-war to post-war link is available for the present "market economies" only.

For manufacturing output, the link for the Soviet Union is provided by the ratio of its output to that of the United States in 1913 and 1925–1929 as estimated in *Industrialization and Foreign Trade*, League of Nations 1945 (henceforth quoted as IFT) and in post-war years according to the ECE estimates used in chapter 1 above. For the other east European countries the same sources were used, supplemented by Alfred Maizels, *Industrial Growth and World Trade*, Cambridge 1963 (henceforth quoted as *IGWT*) for the pre-war share of the parts of Germany which are now in eastern Europe. The pre-war world output index includes China with a weight of 0.3 per cent in 1925–1929 while post-war data exclude Asian centrally planned economies.

For world trade in primary products and manufactures the series in IFT (1913 to 1938) were linked to the United Nations volume indices starting in 1938. The post-war volume indices exclude all centrally planned economies. However, as the east European countries, including an estimate for the parts of Germany now in eastern Europe, accounted in 1938 for 8 per cent of the *value* of world exports, in 1948 for 6 per cent and in 1958 for 9 per cent it was here simply assumed that volume growth in east European exports between 1938 and 1948 equalled that of market economies. The possible error in the world total is obviously small.

2. *The 1955, 1959, 1965 and 1969 world trade matrices*

The basic trade data underlying tables 2.1–2.4 are taken for the first three years from the UNCTAD *Handbook of International Trade and Development Statistics* (New York 1969) and for the year 1969 from United Nations *Monthly Bulletin of Statistics* March 1971. The world has been divided into seven markets: (1) Eastern Europe (including the Soviet Union), (2) EEC, (3) the United Kingdom, (4) Rest of EFTA (excluding Finland), (5) Rest of western Europe, (6) Overseas developed countries (the United States, Canada, Japan, Australia, New Zealand and South Africa); (7) Developing countries (including Asian centrally planned economies except for their intra-trade).

In the United Nations world trade matrix a significant proportion of world exports is not classified according to destination. This relates in particular to United States "special category" exports (largely in SITC 6–8), to bunkers (SITC 3) and to about 3 per cent of east European exports in 1969. The need for some allocation of United States special category exports by markets arises from the revision of United States trade statistics in 1965 which involved a halving of the amount of exports not shown by destination. (The proportion of United States exports in SITC 7 not classified by destination was 21 per cent in 1955 and 5 per cent in 1969.) Here unspecified United States exports have been allocated to SITC 7 and 6+8 according to their proportion in exports to the world.

For all other exporting regions, except eastern Europe, exports unspecified by destination have been excluded. Such east European exports in 1969 are assumed to have been destined for the developing regions.

Exports in SITC 9 (commodities and transactions not classified according to kind) are excluded throughout.

In trade between developing countries certain "double-countings" (crude petroleum from Venezuela to the Carribean for exportation to developed countries after refining, natural rubber sent to Singapore for some minor processing, etc.) have been eliminated in consultation with the UNCTAD secretariat.

Finally, the trade data have been expressed in constant 1963 prices by using the export unit value indices published in the November issues of the United Nations *Monthly Bulletin of Statistics*. Eastern Europe, for which such unit value indices are not available, has been treated as a developed region for external trade; for intra-trade, it was assumed that price changes were one-half of those in trade between developed countries.

The basic matrices distinguish six commodity groups (SITC 0 and 1; 2 and 4; 3; 5; 7; 6 and 8) and the deflation is made according to these groups. The tables show, however, only two commodity classes: primary products (SITC 0–4) and manufactures (SITC 5–8).

3. *The estimates of gross manufacturing output*

As trade in manufactures is represented here by SITC 5–8, products of the food, beverages and tobacco processing industries (ISIC 20–22) as well as of the petroleum and coal processing industry (ISIC 32) are excluded. Apart from ISIC 32, which is not shown separately in the United Nations statistics of world industrial production, these branches have also been excluded from the output data. The conversion of the output data, given in the United Nations *Statistical Yearbook* as the contribution to GDP (i.e. added values), into gross values was done by assuming the following ratios of gross output to value added: Eastern Europe, the United Kingdom and overseas developed countries 1.5; EEC 1.6 (to account for the higher proportion of imported inputs in Benelux than in the other three member countries); rest of EFTA 1.75; rest of western Europe and developing countries 2.0. These conversion factors which necessarily are only tentative were derived from an inspection of the ECE Standardized Input-output Tables supplemented by Maizels (IGWT).

CHAPTER 3

STRUCTURAL TRENDS IN EUROPEAN MANUFACTURING OUTPUT AND TRADE

Chapter 1 emphasized the growing similarity of economic structures, with the spread of industrialization throughout Europe and the relative decline of agriculture. Chapter 2 showed how economic development and industrialization have been accompanied by increasing mutual dependence on international trade in manufactures among the industrial countries. The present chapter deals with the pattern of growth (section (i)) and trade development (section (ii)) within the manufacturing sector. It is concerned, in particular, with the question of whether the growing similarity of over-all production, employment and trade structures is repeated at a more disaggregated level within manufacturing. Finally (in section (iii) of the chapter) a short account is given of some main developments in the construction industry.

(i) Patterns of output and employment in manufacturing

A general European view

In Europe as a whole, manufacturing output[75] increased by about 7.5 per cent a year from 1950–1952 to 1967–1969, fastest in eastern Europe, rather less fast in southern Europe and considerably more slowly in industrial western Europe. A comparison of growth rates by sector in the different parts of Europe can be made only for the last decade, because sufficiently complete detail for west European countries is not available for earlier years. The basic data for the years 1958–1960 to 1967–1969 are given in table 3.1, showing a breakdown into six major branches of manufacturing. In all these comparisons of output, it should be noted that the data for eastern Europe relate to *gross values* of output, while those for western Europe relate to *value added.* It appears that there has been a tendency in eastern Europe for gross output to rise faster than value added, varying between countries and branches and less markedly in more recent years.[76]

In the last decade, the expansion of manufacturing was led in industrial western Europe by the chemicals group—the only one of the six groups with an over-all rate of expansion (at over 9 per cent a year) significantly above the general average (of 5.5 per cent). Output in the metal-using industries grew no faster than total manufacturing output but the large and heterogeneous group obviously includes such fast-growing sectors as electrical engineering, electronics and motor-vehicles. In eastern Europe, the main difference is that both the chemicals and the metal-using industries expanded (each at about 12 per cent a year) well above the general average (8.5 per cent). In southern Europe, too, both chemicals and metal-using grew faster than total manufacturing, but were joined by the "other manufacturing" group (which includes construction materials, plastics processing, etc.). The leading place of the chemicals industry—described as "Pandora's box of modern economic growth"—is a universal feature, depending both on technical advance in processing methods and on increasingly widespread application to a whole range of industries, partly in substitution for other materials.

Metal-making output grew at about the same pace as total manufacturing in eastern and southern Europe, but lagged significantly (especially in iron and steel) in the industrial west.[77] The expansion of textiles and light industries (textiles, clothing, leather, wood and paper products, ceramics, etc.), and of food processing, was distinctly slower than average in all three groups of countries, but rather more markedly so in eastern Europe.

Differences in growth rates of employment followed basically the same pattern: the total number employed in manufacturing in Europe rose from 66 million in 1958–1960 to 80 million in 1967–1969 (table 3.2). In industrial western Europe, however, the increase in employment was less than 2 million (5.5 per cent over the whole period) and was fully accounted for by nearly 2 million additional jobs in the metal-using industries. By contrast, employment in textiles and light industries

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[75] The present chapter deals with *manufacturing* and not with the whole of *industry*, which in conventional classifications also includes mining and electricity, gas and water. (In most of chapter 1, the major sector for analysing over-all economic structures was "industry".) The growth rates of output and employment in manufacturing are very close to those for industry. There are certain differences in the coverage of manufacturing branches, especially between the statistics for east European countries (based on the CMEA branch classification) and those for western Europe (based on the United Nations International Standard Industrial Classification (ISIC)). See notes preceding table 3.1.

[76] See, for example, *Economic Survey of Europe in 1970*, part II, chap. 2, table 15.

[77] Thus crude steel production increased between 1958–1960 and 1967–1969 by 4.8 per cent a year in western (including southern) Europe and by 6.6 per cent a year in eastern Europe. (See *The ECE Region in Figures*, table 73.) Non-ferrous metals increased faster.

NOTES TO TABLES 3.1 TO 3.5

Branch classification of manufacturing

Based on United Nations *International Standard Industrial Classification (1958)*, for western Europe, and CMEA *Classification of National Economy Branches* for eastern Europe. The branches are:

	ISIC	*CMEA*	
Metal-using	35–38	01.05	Electrical and non-electrical machinery, transport equipment
Chemicals and rubber	30–32	01.06	CMEA excludes products of coal, petroleum and shale
Textiles and light industries	23–29	01.08 through 01.13	Textiles, clothing, leather products, wood-working, pulp and paper, glass and china
Food processing	20–22	01.15	Includes drink and tobacco
Metal-making	34	01.03, 01.04	CMEA includes ore mining (except GDR and Hungary)
Other manufacturing	33, 39	01.07, 01.14, 01.16	(Construction material, printing, instruments, plastics processing, etc.) CMEA includes water supply, dry-cleaning and laundries but excludes instruments

It is not claimed that more than rough comparability between west and east European classifications has been secured.

Aggregation of country data of output: Western Europe: Gross added values at 1963 prices and official exchange rates. Eastern Europe: gross output at 1963 prices converted at "exchange rates" implied by comparison of gross domestic product in *Economic Survey of Europe in 1969*, part I, chapters 2 and 4.

Employment: Data for western Europe include estimates for self-employed persons.

Sources: Most of the statistical data used here have been derived from a research project, in progress in the secretariat, on the structure of manufacturing in Europe. The data are all derived from official sources but in many cases, especially for western Europe, the secretariat has made extensive estimates in an effort to achieve a better degree of international comparability.

There are certain differences between the figures given in this chapter, which are mainly derived from national industrial statistics, and those given in chapter 1 which are based mainly on national accounting statistics. Classifications and definitions often differ slightly in these two sets of national sources.

TABLE 3.1

Manufacturing industries: growth of output, employment and labour productivity 1958–1960 to 1967–1969

(Annual cumulative percentages)

	Output			*Employment*			*Output per person employed*		
	Eastern Europe[a]	*Industrial western Europe*[b]	*Southern Europe*[c]	*Eastern Europe*[a]	*Industrial western Europe*[b]	*Southern Europe*[c]	*Eastern Europe*[a]	*Industrial western Europe*[b]	*Southern Europe*[c]
Total manufacturing	8.5	5.5	10.1	3.6	0.5	2.6	4.7	4.8	7.3
Metal-using	12.1	5.3	12.6	5.3	1.7	4.4	6.5	3.6	7.9
Chemicals and rubber	12.3	9.3	12.9	5.8	1.8	2.7	6.1	7.4	10.0
Textiles and light industries . . .	5.6	4.2	7.4	1.9	−0.7	2.0	3.7	5.0	5.3
Food processing	6.2	4.4	7.3	3.0	0.1	0.5	3.2	4.3	6.8
Metal-making	8.1	4.4	10.5	3.2	0.2	2.8	4.9	4.2	7.5
Other manufacturing	9.3	6.5	13.1	2.9	1.1	3.8	6.3	5.3	8.9

Sources: See notes preceding table 3.1. [a] Excluding Albania. [b] Excluding Switzerland. [c] Excluding Turkey.

was reduced by about 700,000. In eastern and southern Europe, not only metal-using but also textiles and light industries gained most from the increases in total manufacturing employment of 11 million in eastern Europe and just over 1 million in southern Europe.

The contributions to output growth of employment and labour productivity followed rather different patterns. For total manufacturing, during the 1960s, the rates of labour productivity growth were about the same in industrial western Europe as in eastern Europe, at just under 5 per cent a year. (In the 1950s, productivity growth in manufacturing had been as much as 6.5 per cent a year in eastern Europe, against only 4 per cent a year in industrial western Europe.)[78] Productivity gains were greater in the west for chemicals, textiles and light industry and food processing, while the east showed larger gains for metal-using. In southern Europe, productivity gains were greater in all branches than in either of the other two areas (see table 3.1).

The contribution of labour productivity increases to the increases in output were:

Percentage contribution of productivity increases to the expansion of manufacturing output, 1958–1960 to 1967–1969[a]

	Industrial western Europe	*Southern Europe*	*Eastern Europe*
Total manufacturing.	90	73	56
Metal-using	68	64	55
Chemicals and rubber	80	78	51
Textiles and light industries.	119	72	66
Food processing	98	93	52
Metal-making.	95	72	60
Other manufacturing	82	70	68

Source: table 3.1.

[a] Logarithms of productivity divided by logarithms of output increase. Based on weighted average of increases in each area.

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[78] See text-table, foot of p. 47, for eastern Europe and 1.4 for western Europe.

TABLE 3.2

Manufacturing industries: branch distribution of employment

(Percentage shares of total manufacturing)

	1958–1960			*1967–1969*		
	Eastern Europe[a]	*Industrial western Europe*[b]	*Southern Europe*[c]	*Eastern Europe*[a]	*Industrial western Europe*[b]	*Southern Europe*[c]
Numbers in millions						
Total manufacturing	28.97	32.24	4.63	39.95	34.05	5.88
Percentage distribution						
Metal-using	34.4	34.6	23.5	39.7	38.1	27.6
Chemicals and rubber	5.3	7.2	6.7	6.4	8.0	6.8
Textiles and light industries . . .	34.5	32.2	40.6	29.5	28.4	38.4
Food processing	11.1	10.8	16.7	10.5	10.3	13.8
Metal-making	6.8	6.6	3.9	6.5	6.3	4.1
Other manufacturing	7.9	8.6	8.6	7.4	8.9	9.3

Sources: See notes preceding table 3.1.
[a] Excluding Albania. [b] Excluding Switzerland. [c] Excluding Turkey.

The branch structures of employment in manufacturing industry in eastern Europe and industrial western Europe, are very similar when a summary branch classification is used (see table 3.2). Minor differences may be explained by differences in the definition of branches (thus the higher share of chemicals in western Europe is partly due to the inclusion of petroleum refining, which is combined with extractive industries in the eastern classification and is therefore outside the "manufacturing" sector). The share of metal-using is somewhat greater in the east, the larger weight of machinery in the output pattern apparently offsetting the smaller weight of motor-vehicles and consumer durables. The changes over time have been broadly in the same directions in the two areas, but rather more accentuated in the east; in both areas, the main changes are the increasing share of metal-using and the falling shares of textiles and other light industries.

In southern Europe, by contrast, the shares of metal-using and metal-making, although increasing over the decade, remain much smaller than in either eastern or industrial western Europe (32 per cent against around 45 per cent); the shares of textiles and light industries and of food processing, although falling, remain much larger in the south (over 50 per cent against about 40–45 per cent).

Comparisons of branch shares of output between east and west are hardly practicable because of differences in relative price structures and in the measures of output available. Such comparisons as have been made for *total* manufacturing, uncertain as they are, suggest that although total employment in manufacturing was about the same in eastern Europe as in western Europe—about 40 million in each area—the volume of total manufacturing output must have been substantially larger in the west.[79] The position is reversed, however, in total usage (in all sectors) of two basic inputs [80] which may reflect differences in input-output structures as well as in output patterns:

	Apparent consumption 1967–1969 in million tons a year	
	Eastern Europe	*Western Europe*
Energy *(coal equivalent)*	1,375	1,182
Crude steel	139	130

Source: The ECE Region in Figures tables 68 and 74.

Manufacturing growth patterns in western Europe in the 1960s

Most countries in industrial western Europe exceeded the growth rate of manufacturing output of 5.5 per cent a year recorded for the area as a whole in the 1960s

TABLE 3.3

Western Europe: some features of manufacturing structures

	Shares in value added (1963 prices)		*Relative wage level (total mfg. = 100)*		*Ratio of wage bill to value added (percentages)*		*Price deflator*[c]	*Unit labour costs*	*Average wages and salaries*[d]
	1958–1960	*1967–1969*	*1958–1960*	*1967–1969*	*1958–1960*	*1967–1969*	*Annual growth rates (per cent) 1958–1960 to 1967–1969*		
Industrial western Europe[a]									
Metal-using	35.9	35.5	108.4	104.5	69.2	77.6	2.6	4.0	7.6
Chemicals	10.2	14.0	122.6	124.5	50.6	56.3	−0.4	0.8	8.2
Textiles and light industries	24.3	21.8	81.0	84.1	68.2	73.9	2.6	3.7	8.5
Food processing	12.9	11.8	94.5	100.9	51.4	58.8	2.7	4.6	8.8
Metal-making	8.1	7.4	123.9	116.8	59.8	74.1	0.5	2.9	7.3
Miscellaneous	8.6	9.5	99.5	93.2	64.7	67.5	1.4	2.1	7.3
Total manufacturing	100.0	100.0	100.0	100.0	63.4	70.6	2.0	3.3	8.1
Southern Europe[b]									
Metal-using	22.9	28.0	107.3	107.5	49.0	64.5	2.6	6.3	14.2
Chemicals	11.5	14.4	135.4	147.1	33.0	46.0	1.0	4.8	15.3
Textiles and light industries	35.1	28.1	86.4	86.8	50.0	64.4	5.3	9.3	14.2
Food processing	16.4	13.0	86.5	80.1	39.8	42.6	5.0	6.9	13.2
Metal-making	5.7	5.9	140.8	141.0	39.1	57.7	2.7	7.2	14.2
Miscellaneous	8.4	10.6	109.8	99.5	50.3	53.5	2.7	3.7	13.0
Total manufacturing	100.0	100.0	100.0	100.0	45.3	57.5	3.6	7.1	14.2

NOTE.—For branch classification see notes preceding table 3.1.

[a] Excluding Switzerland.

[b] Excluding Turkey.

[c] Implied prices (growth of output at current prices divided by growth of output at 1963 prices).

[d] Wage and salary bill (including employers' social security payments, etc.) per wage- and salary-earner, including an estimate for the wage component of self-employer incomes, assumed to be equivalent to average earnings of employed persons.

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[79] It may be recalled that in chapter 1 (i) it was estimated that the proportions of European *GDP* in 1969 were: western (including southern) Europe 60 per cent; eastern Europe 40 per cent. For total manufacturing output, which probably represents a larger share of the eastern than of the western economies, eastern Europe probably accounted for significantly more than 40 per cent of the total for Europe.

[80] A more comprehensive calculation of over-all input-output relationships, based on ECE's comparative input-output tables for 12 European countries for years around *1959*, shows a substantially larger ratio of inputs to outputs—a more "material intensive" structure—in Bulgaria, Czechoslovakia, Hungary, Netherlands and Poland than in the other 7 (western) countries shown. See "Similarities and dissimilarities in structure" in *Economic Bulletin for Europe*, vol. 23, No. 1, 1971, chart 4.3.

the total for the area being depressed by slow expansion in the United Kingdom (3.5 per cent). In southern Europe, the average of 9 per cent was more uniform (table 1.4).

Broadly, the branch pattern of growth in individual countries followed the pattern for the whole area; thus the fast growth rates in chemicals and the low rates in textiles and light industries and in food processing are general features. This is to be expected in view of the common pattern both of income elasticities, and of technical progress, underlying structural change. However, smaller countries (irrespective of degree of industrialization or indeed of over-all rate of growth) tend to show a larger variability of growth rates between branches than large countries. This may be explained by the greater dependence of small countries on foreign trade.[81]

Increased labour productivity accounted for 90 per cent of the increase in total manufacturing output in industrial western Europe (as shown in the text-table above). Fast productivity gains tend to be associated with fast growth of output. The general reason is that fast expansion offers better possibilities for exploiting economies of scale and for increasing the proportion of modern equipment. This generalization broadly holds between countries and between branches in a single country.[82] Thus the fast-growing chemicals industry generally shows the biggest increases in productivity. But one instructive exception appears. The textiles and light industry group shows at least an average increase in labour productivity, in spite of an increase in output much below average (and falling employment). The reason is that weak demand has forced rationalization, and modernization, and fuller use of declining capacity—thus, it appears, improving the average efficiency of plant.[83] Substitution for natural materials of man-made fibres, which are easier to handle, must also have helped to raise productivity.

Increasing labour productivity (nearly 5 per cent a year in industrial western Europe) was accompanied in the 1960s by even faster increases in wages and salaries (about 8 per cent a year) and hence by increasing labour costs per unit of output of over 3 per cent a year. This was more than the 2 per cent rise in producers' prices of manufactured goods (table 3.3). The result was a substantial increase in the wage share of value added (from 63 per cent in the late 1950s, to 71 per cent in the late 1960s).[84] The increases in average wage- and salary-earnings, it is to be noted, were very similar in all the main branches. But since the productivity gains differed, the increases in unit labour costs varied between under 1 per cent a year in chemicals to 4.5 per cent in food processing. Price increases varied from effectively no change in chemicals and in metal-making where the impact on profits was especially acute, to increases of over 2.5 per cent a year in food processing.

Between countries (for total manufacturing) there were of course large differences. The following table shows data for a few countries representing extreme positions in the industrial west.

	Total manufacturing			
	Wages and salaries as per cent of value added		*1967–1969 as per cent of 1958–1960*	
	1958–1960	*1967–1969*	*Unit labour costs*	*Price deflator*
Italy	58.7	68.4	142.6	122.41
Federal Republic of Germany	57.2	72.2	130.1	103.0
France	69.6	67.9	133.9	137.5
Sweden	70.7	72.7	122.7	119.3
United Kingdom	69.3	74.9	131.3	121.5

Source: See notes to tables 3.1 to 3.5.

The large increase in the wage share in Italy and the Federal Republic of Germany reflects the relatively low wage shares, and high profit shares, in the late 1950s, when these countries had only recently achieved full employment; during the 1960s wage and profit shares of value added converged towards the west European averages. The very moderate price increase in the Federal Republic shows that most of the rise in unit labour costs was absorbed by profits. France represents the opposite extreme: most of the heavy rise in unit labour costs was carried into prices and the wage share of value added did not on average increase. These differences in price behaviour and cost structures are among the underlying reasons for the problems of competitive disequilibrium which contributed to the parity changes of the 1960s.

In southern Europe, wage shares of value added in total manufacturing are considerably smaller (57 per cent, against 71 per cent in the industrial countries in the late 1960s). This is one illustration of the difficulty of taking wage shares, at least between countries at different levels of development, as unambiguous indicators of differences in technical methods of production. The higher profit share in southern Europe, in each of the major branches, seems more likely to reflect higher returns on capital invested than the use of technically more capital-intensive methods of production.[85]

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[81] Certain special cases are the exceptionally fast relative growth of the metal-using industry in Belgium (which may be partly due to the establishment of many foreign enterprises), of metal-making in Norway (especially aluminium and steel) and of metal-making and metal-using in Sweden.

[82] Although productivity gains rise (between countries) with the growth rate of output, the *relative* contribution of productivity gains to output increases tends to fall, and that of employment to increase, with increasing growth rates of output (as is shown in the text-table above for the three groups of countries). This is demonstrated, for individual countries, by the cross-country equations to be found in the *Economic Survey of Europe in 1969*, part I, p. 84.

[83] In western Europe as a whole, in the cotton and allied fibres branch, capacity has been reduced between 1960 and 1970 by about 40 per cent for both spinning and weaving. But hours worked per machine have increased by 25 per cent for spinning and by nearly 20 per cent for weaving. (See "European cotton industry statistics", vol. 13, 1971, International Federation of Cotton and Allied Textile Industries, Zurich.)

[84] It is not certain precisely how far the average cyclical conditions of 1967–1969 are comparable with those of 1958–1960; it is normal for the wage share to rise in periods of slow growth. It should also be remembered that the general tendency over the 1960s was towards a reduction in tax rates on corporations.

[85] It may also reflect, however, lower rates of utilization of capital equipment. The estimate of wage shares also include an allowance for the labour share of self-employers' income (see table 3.3. note *d*), which may bias the results.

TABLE 3.4

East European manufacturing industries: structure of gross output, employment and fixed capital stock

(In percentages of total manufacturing)

	Gross output			*Employment*			*Fixed capital stock*		
	1950–1952	*1958–1960*	*1967–1969*	*1950–1952*	*1958–1960*	*1967–1969*	*1950–1952*	*1958–1960*	*1967–1969*
Metal-using									
Bulgaria	7.0	11.8	20.5	17.1	17.7	23.4	14.2	16.2	16.9
Czechoslovakia	24.2	33.3	39.2	32.5	38.4	41.2	19.7	22.9	23.9
German Democratic Republic	24.9	30.1	36.1	35.9	39.6	44.6	..	26.1	29.6[a]
Hungary	26.1	27.6	32.4	34.4	30.4	33.7	25.6	25.6	25.7
Poland	12.5	21.1	32.5	23.4	28.4	34.0	22.9	23.0	24.7
Romania	11.7	18.9	25.7	23.3	24.9	27.5	..	..	..
Soviet Union	16.9	23.6	33.0	32.7	35.5	41.5	35.6	31.2	31.1
Eastern Europe[b]	18.0	24.6	33.0	31.7	34.4	39.7	..	..	..
Chemicals and rubber									
Bulgaria	1.7	3.5	6.4	3.0	3.6	4.8	6.8	9.4	13.7
Czechoslovakia	4.2	5.5	8.2	3.9	4.4	5.3	5.5	7.1	8.2
German Democratic Republic	13.1	13.2	15.2	11.6	12.1	12.6	..	27.4	27.7[a]
Hungary	3.0	4.7	8.9	3.8	4.5	5.6	5.6	9.0	13.2
Poland	5.7	7.8	11.9	6.4	6.9	7.5	8.3	12.7	14.8
Romania	2.3	4.2	9.4	3.2	4.5	6.7	..	..	..
Soviet Union	4.1	5.0	6.9	4.3	4.4	5.8	6.2	7.6	11.8
Eastern Europe[b]	5.0	6.0	8.3	5.1	5.3	6.4	..	..	..
Textiles and light industries									
Bulgaria	35.0	32.2	24.6	47.8	39.2	31.1	30.6	23.4	18.3
Czechoslovakia	28.1	23.1	19.9	36.9	32.4	30.4	20.0	17.0	15.0
German Democratic Republic	26.1	22.1	19.1	35.9	31.7	26.6	..	20.9	17.8[a]
Hungary	26.1	23.3	19.6	32.2	30.3	28.1	22.8	18.3	18.4
Poland	28.2	26.3	21.0	42.0	35.6	31.5	27.8	21.5	20.6
Romania	33.9	29.0	25.7	47.8	44.8	41.9	..	..	..
Soviet Union	36.9	31.9	24.1	37.5	34.4	28.7	18.3	16.8	14.3
Eastern Europe[b]	34.0	29.4	23.1	38.1	34.5	29.5	..	..	..
Food processing									
Bulgaria	48.3	36.0	29.4	20.4	17.3	17.2	33.7	20.2	15.3
Czechoslovakia	28.9	21.2	16.6	12.2	9.6	8.3	13.4	11.2	9.1
German Democratic Republic	25.2	23.2	19.3	7.9	8.5	8.2	..	12.5	10.5[a]
Hungary	25.9	22.8	19.7	13.2	11.3	10.8	23.7	19.2	14.7
Poland	36.8	28.4	19.1	13.4	14.4	13.3	20.6	16.9	14.4
Romania	38.6	31.6	21.7	11.8	10.4	9.7	..	..	..
Soviet Union	29.5	25.7	21.9	12.3	11.1	10.4	14.7	14.1	12.5
Eastern Europe[b]	30.0	25.6	21.2	12.1	11.1	10.5	..	..	..
Metal-making									
Bulgaria	2.9	5.6	6.6	2.8	5.7	6.6	6.1	19.5	26.5
Czechoslovakia	11.2	11.7	11.2	8.8	9.1	9.4	12.5	15.7	19.3
German Democratic Republic	8.6	9.4	8.3	4.2	4.3	4.7	..	8.0	8.8[a]
Hungary	15.0	15.2	13.4	8.2	7.8	7.4	15.6	20.8	20.8
Poland	12.6	11.7	10.1	7.4	6.6	6.4	9.6	15.4	16.4
Romania	10.4	12.2	13.2	6.4	7.5	7.5	..	..	..
Soviet Union	10.1	9.9	9.9	7.1	6.9	6.4	21.3	21.9	21.4
Eastern Europe[b]	10.3	10.3	10.0	6.9	6.8	6.5	..	..	..

TABLE 3.4 (*continued*)

East European manufacturing industries: structure of gross output, employment and fixed capital stock

(In percentages of total manufacturing)

	Gross output			*Employment*			*Fixed capital stock*		
	1950–1952	*1958–1960*	*1967–1969*	*1950–1952*	*1958–1960*	*1967–1969*	*1950–1952*	*1958–1960*	*1967–1969*
Other manufacturing									
Bulgaria	5.1	10.9	12.4	8.9	16.5	16.9	8.6	11.2	9.3
Czechoslovakia	3.5	5.3	5.0	5.7	6.1	5.4	28.9	26.1	24.5
German Democratic Republic	2.0	2.1	2.1	4.4	3.8	3.4	..	5.0	5.5[a]
Hungary	4.0	6.4	5.9	8.2	15.6	14.4	6.7	7.0	7.3
Poland	4.1	4.7	5.4	7.4	8.3	7.3	10.8	10.5	9.1
Romania	3.1	4.0	4.3	7.4	7.8	6.8	..	..	..
Soviet Union	2.5	3.9	4.2	6.0	7.8	7.3	3.9	8.5	8.9
Eastern Europe[b]	2.7	4.1	4.4	6.1	7.9	7.4	..	..	..

Sources: See notes preceding table 3.1. [a] 1966–1968. [b] Corresponding percentage shares excluding the German Democratic Republic and Romania (for which full data on capital stock not available) are:

	Gross output			*Employment*			*Fixed capital stock*		
	1950–1952	*1958–1960*	*1967–1969*	*1950–1952*	*1958–1960*	*1967–1969*	*1950–1952*	*1958–1960*	*1967–1969*
Metal-using	17.4	24.2	33.1	31.6	34.3	39.9	29.1	28.1	28.9
Chemicals and rubber	4.1	5.3	7.5	4.5	4.6	5.9	6.3	8.2	11.7
Textiles and light industries	35.0	30.3	23.4	37.9	34.3	29.1	20.3	17.6	15.3
Food processing	30.2	25.6	21.3	12.5	11.5	10.7	15.7	14.1	12.4
Metal-making	10.5	10.3	10.1	7.2	7.0	6.6	17.0	19.7	20.6
Other manufacturing	2.8	4.3	4.6	6.3	8.3	7.8	11.6	12.3	11.1

It must be remembered, too, that manufacturing industry in southern Europe is largely undertaken by small establishments which must rely heavily on self-finance. In southern Europe (excluding Yugoslavia) about 40 per cent of manufacturing employment is in establishments with less than 10 persons employed (compared with about 10 per cent in the industrial countries, other than Italy).[86]

Manufacturing output and factor input trends in eastern Europe over two decades

In eastern Europe, changes in the main features of manufacturing growth were more conspicuous, and are described in more detail.

A certain slowing down in growth rates of total and industrial output in the 1960s, compared with the 1950s, was noted above (page 8). The slowing down in output growth was marked in all the major branches, but least so in the priority sector of chemicals. Declining rates of employment growth were not so frequent and the main

Eastern Europe: growth of output, employment and productivity

(Annual rates per cent)

A = 1950–1952 to 1967–1969
B = 1950–1952 to 1958–1960
C = 1958–1960 to 1967–1969

	Gross output			*Employment*			*Output per person employed*		
	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
Total manufacturing	9.5	10.7	8.5	3.8	3.9	3.6	5.5	6.5	4.7
Metal-using	13.5	15.1	12.1	5.2	5.0	5.3	8.0	9.6	6.5
Chemicals and rubber	12.8	13.3	12.3	5.1	4.3	5.8	7.3	8.7	6.1
Textiles and light industries	7.1	8.7	5.6	2.2	2.6	1.9	4.7	6.0	3.7
Food processing	7.3	8.5	6.2	2.9	2.9	3.0	4.2	5.5	3.2
Metal-making	9.3	10.7	8.1	3.4	3.7	3.1	5.7	6.8	4.9
Other manufacturing	12.6	16.4	9.3	5.0	7.3	2.9	7.4	8.6	6.3

Source: See table 3.1.

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[86] The data mostly relate to the early 1960s; the corresponding figure for Italy was 30 per cent.

Table 3.5

Eastern Europe: manufacturing industries—factor inputs and factor productivity

(Annual cumulative percentages)

A = 1950–1952 to 1967–1969
B = 1950–1952 to 1958–1960
C = 1958–1960 to 1967–1969

	Gross output			*Employment*			*Fixed capital stock*			*Output per person employed*			*Fixed capital per person employed*			*Output per unit of fixed capital*		
	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
Total manufacturing																		
Bulgaria	12.5	13.3	11.8	7.0	8.4	5.7	12.8	11.2	14.2	5.2	4.6	5.8	5.4	2.6	8.0	−0.2	2.0	−2.1
Czechoslovakia	8.3	10.3	6.5	2.6	3.1	2.1	4.7	4.3	5.0	5.6	7.0	4.3	2.0	1.2	2.8	3.5	5.7	1.5
Hungary	8.1	8.5	7.8	4.0	4.8	3.4	7.4	7.3	7.5	4.0	3.6	4.3	3.3	2.5	4.0	0.7	1.1	0.3
Poland	10.3	11.8	8.9	3.7	4.1	3.3	7.4	7.8	7.1	6.3	7.4	5.4	3.6	3.6	3.6	2.7	3.7	1.8
Soviet Union	9.6	10.7	8.7	4.1	4.1	4.0	10.1	9.8	10.4	5.4	6.4	4.5	5.8	5.6	6.1	−0.5	0.8	−1.5
Five countries	9.6	10.7	8.6	4.0	4.1	3.8	8.6	8.2	9.0	5.4	6.3	4.5	4.5	3.9	5.0	0.9	2.3	−0.4
German Democratic Republic	8.3	10.7	6.3	1.2	2.2	0.4	..	..	5.7	7.1	8.4	5.9	..	..	5.3	..	..	0.5
Romania	11.8	10.6	12.8	4.6	3.8	5.3	..	..	..	6.9	6.6	7.1	..	..	..	..	..	..
Metal-using																		
Bulgaria	19.9	21.0	18.9	9.0	8.8	9.1	13.9	13.0	14.8	10.0	11.1	9.1	4.5	3.9	5.1	5.3	7.1	3.7
Czechoslovakia	11.4	14.8	8.4	4.0	5.3	2.9	5.9	6.3	5.5	7.1	9.1	5.4	1.7	0.9	2.5	5.3	8.1	2.8
Hungary	9.5	9.3	9.7	3.9	3.2	4.6	7.5	7.4	7.6	5.5	6.0	5.0	3.4	4.0	2.9	1.9	1.9	2.0
Poland	16.6	19.3	14.2	6.0	6.7	5.4	7.9	7.9	7.9	10.1	12.2	8.3	1.7	1.0	2.3	8.2	10.8	5.9
Soviet Union	14.0	15.4	12.8	6.0	5.1	5.9	9.2	8.0	10.3	8.1	9.8	6.6	3.5	2.8	4.2	4.4	6.8	2.3
Five countries	13.8	15.3	12.4	5.4	5.2	5.6	8.6	7.7	9.4	8.0	9.6	6.5	3.0	2.4	3.6	4.8	7.1	2.8
German Democratic Republic	10.7	13.4	8.4	2.5	3.5	1.7	..	..	7.3	8.0	9.7	6.6	..	..	5.5	..	..	1.1
Romania	17.1	17.4	16.8	5.6	4.7	6.5	..	..	..	10.9	12.3	9.8	..	..	..	..	..	..
Chemicals and rubber																		
Bulgaria	21.8	24.1	19.7	9.9	10.5	9.3	17.6	15.9	19.1	10.8	12.2	9.6	7.0	4.9	8.8	3.6	7.0	0.7
Czechoslovakia	12.7	14.2	11.3	4.4	4.5	4.3	7.1	7.6	6.6	8.0	9.4	6.8	2.6	3.0	2.2	5.3	6.2	4.5
Hungary	15.4	15.0	15.7	6.5	7.0	6.0	13.0	13.9	12.1	8.4	7.6	9.2	6.2	6.7	5.7	2.2	0.9	3.3
Poland	15.1	16.1	14.3	4.6	5.0	4.3	11.2	13.7	9.0	10.1	10.6	9.6	6.3	8.3	4.5	3.6	2.1	4.9
Soviet Union	13.1	13.5	12.7	5.9	4.2	7.3	14.4	12.7	15.9	6.8	8.9	5.0	8.1	8.1	8.0	−1.1	−0.8	−2.9
Five countries	13.5	14.0	13.0	5.7	4.6	6.7	12.7	11.9	13.4	7.4	9.1	5.9	6.6	7.0	6.3	0.7	1.9	−0.3
German Democratic Republic	9.3	10.8	7.9	1.7	2.8	0.8	..	..	5.8	7.5	7.9	7.1	..	..	5.0	..	..	2.0
Romania	21.3	19.2	23.2	9.3	8.4	10.0	..	..	..	11.1	10.1	12.0	..	..	..	..	..	..
Textiles and light industries																		
Bulgaria	10.2	12.1	8.6	4.3	5.7	3.0	9.4	7.5	11.1	5.7	6.1	5.4	4.9	1.7	7.8	0.8	4.3	−2.2
Czechoslovakia	6.1	7.6	4.7	1.4	1.4	1.4	2.9	2.3	3.5	4.6	6.1	3.3	1.5	0.9	2.1	3.1	5.2	1.2
Hungary	6.3	6.9	5.8	3.2	4.0	2.5	6.1	4.4	7.5	3.0	2.8	3.2	2.8	0.4	4.9	0.3	2.4	−1.6
Poland	8.3	10.8	6.3	2.0	2.0	1.9	5.5	4.4	6.6	6.3	8.6	4.2	3.5	2.4	4.5	2.8	6.1	−0.1
Soviet Union	6.9	8.7	5.4	2.4	2.9	2.0	8.6	8.6	8.5	4.4	5.6	3.4	6.0	5.6	6.4	−1.5	0.1	−2.9
Five countries	7.0	8.8	5.5	2.4	2.8	2.0	6.8	6.3	7.4	4.5	5.8	3.4	4.4	3.3	5.3	0.2	2.4	−1.8
German Democratic Republic	6.4	8.4	4.6	−0.6	0.7	−1.6	..	..	3.6	7.0	7.7	6.3	..	..	5.3	..	..	0.9
Romania	10.0	8.5	11.3	3.8	3.0	4.5	..	..	..	6.0	5.4	6.6	..	..	..	..	..	..

Food processing																		
Bulgaria	9.3	9.3	9.3	5.9	6.2	5.6	7.6	4.3	10.7	3.2	3.0	3.4	1.6	−1.9	4.9	1.6	5.0	−1.3
Czechoslovakia	4.8	6.1	3.6	0.3	0.1	0.5	2.3	2.1	2.5	4.5	6.0	3.1	2.0	2.0	2.0	2.4	4.0	1.1
Hungary	6.4	6.7	6.1	2.8	2.8	2.8	4.4	4.5	4.4	3.5	3.8	3.2	1.6	1.7	1.5	1.9	2.1	1.7
Poland	6.1	8.2	4.2	3.7	5.0	2.5	5.2	5.2	5.2	2.3	3.0	1.7	1.5	0.1	2.7	0.8	2.8	−0.9
Soviet Union	7.7	8.7	6.7	3.0	2.7	3.3	9.0	9.2	8.9	4.5	5.9	3.3	5.8	6.3	5.4	−1.2	−0.3	−2.0
Five countries	7.3	8.4	6.4	3.0	2.9	3.1	7.1	6.8	7.4	4.2	5.4	3.1	3.9	3.7	4.1	0.2	1.6	−1.0
German Democratic Republic	5.6	9.5	4.2	1.4	3.0	−0.1	..	..	3.9	5.2	6.4	4.2	..	..	3.9	..	..	0.3
Romania	8.1	7.9	8.2	3.4	2.2	4.5	..	..	..	4.6	5.7	3.6	..	..	..	..	..	..
Metal-making																		
Bulgaria	18.1	23.0	14.0	12.5	18.4	7.4	23.0	28.6	18.2	5.0	3.7	6.2	9.3	8.4	10.1	−3.9	−4.4	−3.5
Czechoslovakia	3.3	10.9	6.0	3.0	3.5	2.6	7.4	7.4	7.4	5.2	7.2	3.4	4.3	3.8	4.7	0.8	3.3	−1.3
Hungary	7.4	8.6	6.4	3.4	4.8	2.7	9.3	11.3	7.5	3.9	4.3	3.6	5.7	6.9	4.7	−1.7	−2.4	−1.0
Poland	8.9	10.5	7.2	2.9	2.7	3.1	10.9	14.4	7.9	5.9	7.9	4.0	7.8	11.5	4.6	−1.8	−3.3	−0.5
Soviet Union	9.5	10.4	8.6	3.4	3.6	3.1	10.2	10.2	10.1	5.9	6.6	5.3	6.6	6.4	6.8	−0.6	0.2	−1.4
Five countries	9.3	10.5	8.2	3.4	3.7	3.1	9.9	10.3	9.5	5.7	6.6	4.9	6.3	6.3	6.2	−0.5	0.3	−1.2
German Democratic Republic	8.1	11.9	4.8	1.8	2.4	1.3	..	..	6.8	6.2	9.5	3.4	..	..	5.4	..	..	−2.0
Romania	13.4	12.8	13.8	5.6	5.9	5.4	..	..	..	7.4	6.5	8.1	..	..	..	..	..	..
Other manufacturing																		
Bulgaria	18.5	24.6	13.4	11.1	17.1	6.0	13.3	14.9	12.0	6.8	6.6	7.0	2.0	−1.8	5.5	4.7	8.6	1.3
Czechoslovakia	10.6	[illegible]	5.8	2.3	4.0	0.8	3.7	3.1	4.2	8.2	11.9	4.9	1.3	−0.9	3.4	6.7	12.9	1.5
Hungary	10.7	15.2	6.8	[illegible]	13.6	2.5	8.0	8.0	7.9	2.9	1.4	4.2	0.3	−5.1	5.3	2.6	6.8	−1.1
Poland	12.0	[illegible]	10.6	3.6	5.5	1.9	6.4	7.5	5.5	8.2	7.8	8.5	2.7	1.8	3.5	5.3	5.8	4.9
Soviet Union	13.1	[illegible]	9.5	[illegible]	7.6	3.2	15.6	21.2	10.8	7.5	9.0	6.2	9.9	12.7	7.5	−2.2	−3.2	−1.2
Five countries	12.8	[illegible]	9.3	5.3	7.9	3.0	8.3	9.0	7.8	7.2	8.4	6.1	2.9	1.0	4.6	4.2	7.3	1.5
German Democratic Republic	8.3	[illegible]	6.5	−0.2	0.4	−0.8	..	..	−6.6	9.1	11.0	7.3	..	..	7.5	..	..	0.0
Romania	14.0	14.5	13.7	4.1	4.6	3.6	..	..	..	9.6	9.6	9.7	..	..	..	..	..	..

Eastern Europe: total manufacturing output

	Annual percentage growth of gross output			*Percentage contribution of labour productivity to growth of manufacturing output*	
	1950–1952 to 1967–1969	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*	*1950–1952 to 1958–1960*	*1958–1960 to 1967–1969*
Bulgaria	12.5	13.3	11.8	36	50
Czechoslovakia	8.3	10.3	6.5	69	67
German Democratic Republic	8.3	10.7	6.3	79	93
Hungary	8.1	8.5	7.8	43	56
Poland	10.3	11.8	8.9	64	62
Romania	11.8	10.6	12.8	63	57
Soviet Union	9.6	10.7	8.7	61	53
Eastern Europe	9.5	10.7	8.5	62	56

Source: table 3.1.

change was the slower growth of labour productivity after the very rapid increases of the 1950s. Total manufacturing growth slowed down in all countries except Romania (but in Hungary only very moderately). The pattern in the 1960s—slower growth than the average for the area in the two most industrialized countries, Czechoslovakia and the German Democratic Republic, against much faster growth in the two least industrialized, Bulgaria and Romania—strengthened the tendency towards convergence. Changes in the relative contribution of labour productivity gains to the increase in total manufacturing output varied considerably between countries; in particular, productivity gains in the 1960s accounted for almost all the 6 per cent increase in output in the German Democratic Republic.

Over the 17 years from 1950–1952 to 1967–1969, total manufacturing gross output grew by 4.7 times in the area as a whole, while the fixed capital stock quadrupled (in the five countries for which data are available),[87] and employment nearly doubled; thus fixed capital per person employed was nearly doubled and labour productivity increased by nearly 2.5 times. But the rise in capital per unit of output was relatively small (16 per cent). The impact of these changes on the branch structure of manufacturing output, employment and capital stock, for the major branches and the individual countries, is illustrated by table 3.4. For changes of output in relation to labour and capital inputs see table 3.5.

Between branches, the relationships varied greatly. The *metal-using* industries increased their share of total gross output most, from 18 per cent to 33 per cent. The increase affected every country (although it was somewhat less in Hungary). The employment structure changed similarly but more moderately; but the rise in capital stock was more variable. Fixed capital per worker in metal-using increased less than in total manufacturing (except in Hungary), but productivity gains were everywhere larger than in total manufacturing. This industry group showed, in all countries, exceptionally fast increases both in labour and capital productivity.

The shift to *chemicals*, in output and employment, was marked everywhere—least in the German Democratic Republic which was already in the early 1950s a specialist producer in this branch. But the development of chemicals, in contrast to that of metal-using, has been marked by a particularly fast growth of the capital stock and consequently by exceptionally fast increases in capital per worker, as well as in faster than average labour productivity gains. Developments in the *metal-making* industry also suggest a capital-intensive pattern. The branch's share of total output and employment did not change much (except for the establishment of what is effectively a new industry in Bulgaria) but its share of capital stock increased substantially, although not in the Soviet Union.

Textiles and light industries and *food processing* almost everywhere showed the slowest growth rates and, consequently, falling shares of output, employment and capital stock, in both decades. But labour productivity and capital per worker increased only slightly less than average.

Between countries, one contrast stands out. In Czechoslovakia and Poland, as compared with the other countries, both labour productivity and output per unit of capital increased fast, and capital per worker slowly. These features, which apply to most branches, imply especially high returns to combined inputs of capital and labour; they may reflect the opportunities in the early 1950s for staffing and bringing into operation equipment not fully used, and also the possibilities for concentration of enterprises, and standardization of products, following nationalization. The differences between these two countries and the rest were much more marked in the earlier post-war years. The German Democratic Republic diverged in one major respect from the general pattern in the 1960s: the effect on output growth of the negligible increase in employment was in part offset by faster growth of labour and capital productivity than in the area as a whole, but not by any exceptional growth in capital per person employed.

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[87] Data on capital stock are not available for Romania, and for the German Democratic Republic only from 1958–1960.

Fixed capital stock per person employed, by manufacturing sectors

(Average for total manufacturing = 100)
A = 1950–1952
B = 1967–1969

	Metal-using		*Chemicals and rubber*		*Textiles and light industries*		*Food processing*		*Metal-making*		*Other manufacturing*	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
Bulgaria	83	72	227	285	64	59	165	89	341	402	97	55
Czechoslovakia	61	58	141	155	54	49	110	110	142	205	507	454
Hungary	84	76	147	236	71	65	180	136	190	281	82	51
Poland	81	73	130	197	66	65	154	108	130	256	146	125
Soviet Union	88	75	144	203	49	50	120	120	300	334	65	122
Five countries	92	72	121	198	54	53	126	116	236	312	184	142
German Democratic Republic	66[a]	66[b]	226[a]	220[b]	66[a]	67[b]	147[a]	128[b]	186[a]	187[b]	132[a]	162[b]

[a] 1958–1960. [b] 1966–1968.

The striking and widespread increases in the capital intensity of manufacturing are illustrated by the following figures:

Fixed capital stock per person employed in manufacturing

(1967–1969 as per cent of 1950–1952)

Bulgaria	244	Poland	182
Czechoslovakia	140	Soviet Union	261
Hungary	174	Total for 5 countries	211
German Democratic Republic: 1966–1968 as percentage of 1958–1960:			151

In total, capital intensity about doubled in the area; but in chemicals and metal-making it increased threefold; in textiles and light industries and in food processing it doubled; while in metal-using and other manufacturing it increased by only about two-thirds (see table 3.5).

A certain common pattern emerges in the changes in capital intensity by branches.

Over the two decades, relative capital per person employed increased in the two most highly capital-intensive branches—chemicals and metal-making—in all five countries for which figures are available (although not in the German Democratic Republic, according to data for the 1960s only). Consequently the spread between the more and the less capital-intensive branches tended to increase—indicating increasing concentration of investment on the more capital-intensive sectors of industry.

The most striking feature of the shifts in structures is the quite rapid convergence towards a common branch pattern. It is not indeed to be expected that much evidence of branch specialization will be exhibited at the level of aggregation used here. Nevertheless certain tendencies do appear. Czechoslovakia and the German Democratic Republic maintain high shares, compared with other countries, in metal-using, and the German Democratic Republic in chemicals; in food processing Bulgaria still has a much higher share than average, although its relative importance has fallen; Poland has seen an exceptionally large expansion in chemicals.

(ii) Structural change in output and foreign trade [88]

The volume of European imports and exports of manufactures increased between 1955 and 1969 about twice as fast as manufacturing output. In both east and west European countries the structural changes in output described above were accompanied by changes in the trade patterns. In the already industrialized countries the changes in output and export patterns were, however, rather moderate and mainly reflected the faster than average growth of the chemicals industry. In the relatively less industrialized countries structural change was more marked as their industrial structures approached those of the already industrialized countries. Thus there was a strong tendency for the individual countries' industrial structures to become similar.

Trade structures broadly moved in the same direction as production changes, with the fastest export and import growth in the chemicals industry and with a tendency for trade structures to become more similar between countries as well as for export and import structures of individual countries to converge. However, even if trade developments reflected to a large extent increasing intra-branch specialization, inter-branch specialization remained strong; trade structures consequently continue to display greater inter-country differences than production structures.

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[88] Unlike the preceding section, gross output data are used here for both eastern and western Europe. Furthermore, in order to achieve comparability with trade statistics the east European output data include here fuels, both unprocessed and processed. For further details on sources and methods, see the notes to table 3.8. The number of branches used in the analysis varies according to the data available.

Similarity indices for production and trade[a]

A = Beginning of 1960s
B = End of 1960s

	Eastern Europe[b]						Western Europe[c]					
	Production		Exports		Imports		Production		Exports		Imports	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
Eastern Europe												
Production	90		71	75	73	78	86	92	..	..	..	..
Exports			94		86	85			79	79	..	..
Imports					93						82	84
Western Europe												
Production							95		83	84	86	87
Exports									94		86	93
Imports											95	

NOTE. — An index placed between A and B denotes the change over time.

[a] Based on 10-branch distribution. Similarity index = 100 minus sum of positive (or negative) differences between two percentage distributions. An index of 100 = identical distribution.

[b] Excluding German Democratic Republic and Romania. The production structures are unweighted average of five countries' structures; for trade, weighted averages.

[c] Based on data for 16 countries.

A broad comparison between structural changes in eastern and western Europe, taken as groups, displays *(a)* a greater change in the eastern output structure than in the west, but about the same change in the trade pattern; *(b)* convergence between the two areas' output structures; *(c)* convergence between the output and trade structures in eastern Europe (but not significantly in western Europe); and *(d)* convergence between export and import structures within western Europe (but not in eastern Europe). A statistical measure of these developments is shown above.

The main differences between east and west European output and trade structures at the end of the 1960s are shown in the text-table below. The inclusion of mining in east European output and trade data obviously affects the comparisons; an approximate correction would still show that the chemicals industry accounted for a significantly higher share in west than in east European output.

A corresponding tentative adjustment of the east European export data would no doubt result in higher shares of [illegible] and processed food in east European than in west European exports, while chemicals, textiles and other light industry products are more important in west than in east European exports. In imports, where a smaller adjustment for mining products is required, the main differences between the two regions' structures are again the very large share of engineering products in eastern Europe and the relatively small share of chemicals.[89]

Whatever the shortcomings of the output and trade data presented, the conclusions drawn above remain valid: developments over the past decade have brought the east and west European output structures closer together so that only small differences remain. There was no such convergence between the two regions' trade structures. In eastern Europe, chemicals and light industry products still account for a much lower proportion of the region's total trade than in western Europe.

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[89] The inclusion of the German Democratic Republic would no doubt give a different picture, raising the share of engineering products and in particular of chemicals in exports and lowering the share of engineering products in imports.

Output and trade structures late 1960s

	Production		Exports		Imports	
	Eastern Europe	*Western Europe*	*Eastern Europe*	*Western Europe*	*Eastern Europe*	*Western Europe*
Metal-using	29.9	30.7	39.0	38.5	45.4	32.0
Chemicals and rubber	8.3	11.2	5.8	14.6	9.3	14.4
Textiles and light industries	18.5	18.1	10.8	17.1	14.9	18.9
Food processing	19.1	18.7	10.2	7.5	9.2	9.8
Metal-making	9.3	8.3	18.2	11.2	14.0	12.8
Fuels[a]	6.2	2.6	13.1	3.5	5.6	4.5
Other manufacturing	8.7	10.4	2.9	7.6	1.6	7.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

In eastern Europe crude and processed fuels; in western Europe petroleum and coal products only.

Eastern Europe: similarity indices[a]

	1955–1957 / 1968–1970			Production/ exports		Production/ imports		Exports/ imports	
	Production	Exports	Imports	1955–1957	1968–1970	1955–1957	1968–1970	1955–1957	1968–1970
Bulgaria	79	64	89	77	73	29	49	45	60
Czechoslovakia	93[b]	95[b]	87[b]	75[c]	75	75[c]	80	64[c]	74
Hungary	87	89	79	79	82	64	79	53	78
Poland	78	63	94	63	80	52	70	49	80
Soviet Union	84	93	82	57	66	70	77	73	61
Total	90[b]	94[b]	93[b]	71[c]	75	73[c]	78	86[c]	85

[a] Based on 11-branch distribution (those used for the east-west comparisons above plus electricity generation).
[b] 1960–1962 / 1968–1970. [c] 1960–1962.

The averages for eastern and western Europe quoted above obviously hide significant differences between the individual countries. In what follows, data are shown for each of the five east European countries for which detailed information is available; the 16 west European countries are divided into three groups: (*a*) the four large countries (Federal Republic of Germany, France, Italy, the United Kingdom); (*b*) seven small industrial countries (Austria, Belgium,[90] Denmark, Finland, the Netherlands, Norway and Sweden; and (*c*) five others (Greece, Ireland, Portugal, Spain and Yugoslavia).

Among the five east European countries, export structures over the past 10 to 15 years have become more similar to production structures in Poland, the Soviet Union and Hungary but not in Czechoslovakia and Bulgaria (see text-table above).

Import structures also tended to resemble more closely the production structures, particularly in Hungary and Poland. In Bulgaria the import and production structures are very different: heavy industries accounted in 1968–1970 for the greater part of imports but for only one-third of production. Since almost one-half of Bulgarian exports consists of textiles, processed foods and other light industry products, the country's import and export structures remain very different. This is also true of the Soviet Union.

Western Europe's combined production structure changed relatively little during the 1960s. The similarity indices in the text-table below show that structural change in western Europe's exports of manufactures was also moderate but that the import pattern changed more. This is also illustrated by the fact that the export and import structures became much more similar, reflecting the increasing share of intra-trade in western Europe's trade in manufactures.

The export structures in the four large countries changed only moderately, their exports already being concentrated on the most dynamic manufacturing branches. In the seven small industrial countries, the export structure changed more, reflecting the relative decline of branches in which these countries originally specialized (food processing, wood products, pulp and paper, steel making). (See table 3.7 for data on production and trade structures, the 20 branches there being aggregated into six.) In the five others the export structure changed even more as the share in total exports of processed food, beverages, wood and base metals fell while the share of textiles, clothing, chemicals and machinery increased.[91]

The structural change in imports was greatest in the four large countries, mainly because processed food accounted for a very large proportion of their total imports of manufactures in 1958–1960. That proportion

Western Europe: similarity indices[a]

	Gross output		Exports		Imports	
	1958–1960	1967–1969	1958–1960	1967–1969	1958–1960	1967–1969
Gross output	94		79	80	78	80
Exports			92		85	92
Imports					86	

[a] Based on 20-branch distribution.

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[90] Belgium-Luxembourg. Trade data refer to these two countries combined excluding their intra-trade. Industrial output in Luxembourg has been added to Belgian output in two branches, chemicals and metal-making.

[91] Percentage distribution of west European manufacturing gross output and trade of the three country groups:

	Gross output		Exports		Imports	
	1958–1960	1967–1969	1958–1960	1967–1969	1958–1960	1967–1969
Four large countries	77	74	68	66	57	57
Seven small countries	17	18	29	30	36	34
Five other countries	6	8	3	4	7	9
Sixteen countries	100	100	100	100	100	100

NOTES TO TABLES 3.6 TO 3.9

The estimates of sectoral trade proportions in *east European* countries (table 3.8) were obtained as follows:

(1) Trade statistics in foreign currency prices were re-classified to correspond to the CMEA 11-branch classification of industrial output involving in several instances secretariat estimates.

(2) Exports and imports in domestic prices in a particular input-output year were extrapolated for other years by means of (1).

(3) Gross output in the input-output year was extrapolated for other years by means of volume indices of industrial output.

(4) The combination of (2) and (3) yields the sectoral trade proportions during the period studied. The use of trade data in current prices and output data in constant may impart a slight *upward* bias on the proportions.

For *west European* countries (1) trade statistics in current prices were re-arranged into the 20-branch ISIC and expressed in 1963 prices by means of a set of deflators applied uniformly to each country and to imports and exports.

(2) The original output-series, given in value added terms, were blown up to gross value by means of the 1959 relationship between gross value and value added in five Common Market countries. The mean deviation of the, unweighted, average was particularly big in the following branches: petroleum and coal products; textiles; furniture; tobacco products; transport equipment; metal-making.

(3) The combination of (1) and (2) yields the sectoral trade portions during the period studied. The use of a constant relationship over time between gross value and value added may (as the share of imported inputs from the same branch abroad appears to have grown fast) impart a downward bias on output growth and hence an upward bias on the trade proportions.

TABLE 3.6

Eastern Europe: estimated commodity composition of exports and imports of industrial products

(Percentages based on trade data at current prices)

	BULGARIA				CZECHOSLOVAKIA				HUNGARY			
	Exports		*Imports*		*Exports*		*Imports*		*Exports*		*Imports*	
	1955–1957	*1968–1970*	*1955–1957*	*1968–1970*	*1960–1962*	*1968–1970*	*1960–1962*	*1968–1970*	*1955–1957*	*1968–1970*	*1955–1957*	*1968–1970*
Electricity	—	—	0.3	0.3	0.4	0.2	0.3	1.2	—	0.3	1.3	2.2
Fuels, crude and processed	2.5	0.4	7.2	10.9	5.1	3.8	10.3	9.6	1.7	1.2	17.4	7.1
Ores and metals	25.4	8.9	22.7	16.3	12.5	13.4	25.1	17.2	12.6	15.8	20.2	18.3
Engineering goods	8.2	35.5	47.7	50.7	52.5	56.2	32.3	41.5	41.2	38.4	18.0	34.5
Chemicals	2.9	4.6	9.9	9.0	4.1	3.9	11.5	11.8	4.5	9.6	12.0	12.1
Construction materials	2.4	1.4	0.7	0.8	1.7	1.8	1.1	0.9	1.2	1.0	0.7	2.6
Wood products	5.5	3.1	0.1	1.1	4.3	3.1	1.8	1.9	1.2	2.1	12.9	6.2
Pulp and paper	0.1	0.2	3.4	2.2	1.1	0.8	0.5	1.3	—	0.1	3.4	3.4
Textiles, clothing and leather goods	24.8	10.5	6.5	4.0	11.5	9.9	1.6	3.5	12.3	14.0	2.6	4.2
Processed food, beverages and tobacco	28.0	35.1	1.0	4.4	3.6	3.6	14.4	10.2	21.4	15.3	9.6	8.5
Other industrial products	0.2	0.3	0.5	0.3	3.2	3.3	1.1	0.9	3.9	2.2	1.9	0.9

	POLAND				SOVIET UNION				TOTAL			
	1955–1957	*1968–1970*	*1955–1957*	*1968–1970*	*1955–1957*	*1968–1970*	*1955–1957*	*1968–1970*	*1960–1962*	*1968–1970*	*1960–1962*	*1968–1970*
Electricity	—	0.2	0.4	0.2	—	0.5	—	—	0.2	0.3	0.3	0.5
Fuels, crude and processed	47.7	13.6	7.3	8.2	19.1	20.6	9.3	2.1	15.8	13.1	7.0	5.6
Ores and metals	10.8	9.3	20.5	24.6	27.3	24.3	12.3	8.0	18.9	18.1	17.0	13.9
Engineering goods	17.2	44.4	46.8	43.9	28.0	31.2	38.3	48.2	34.2	38.9	40.0	45.3
Chemicals	3.0	6.9	13.1	10.6	5.1	5.6	5.9	7.4	4.8	5.8	8.8	9.2
Construction materials	0.9	0.9	1.1	1.1	1.6	2.5	1.0	0.8	1.3	1.9	1.0	1.1
Wood products	1.9	2.2	0.3	1.0	5.0	4.6	3.5	3.4	4.5	3.6	2.8	2.8
Pulp and paper	1.2	0.2	1.7	1.6	1.5	1.0	1.5	1.7	0.9	0.7	1.3	1.9
Textiles, clothing and leather goods	5.0	9.7	4.1	4.4	3.0	1.9	10.0	16.8	6.8	6.4	10.7	10.2
Processed food, beverages and tobacco	11.4	11.6	4.0	3.8	9.4	7.7	18.2	11.6	11.5	10.2	10.8	9.2
Other industrial products	0.9	1.0	0.7	0.6	—	0.1	—	—	1.2	1.0	0.5	0.4

Sources: See notes to tables 3.6 to 3.9.

TABLE 3.7

Western Europe: structural change in manufacturing gross output and trade[a]

(Percentages)

O = Gross output X = Exports M = Imports

Branch	*Period*	*Four large countries*			*Seven small countries*			*Five other countries*			*Total*		
		(O)	(X)	(M)	(O)	(X)	(M)	(O)	(X)	(M)	(O)	(X)	(M)
Food processing	1958–1960	18.7	5.2	25.7	26.5	15.7	6.1	26.7	38.4	11.1	20.6	9.3	17.5
	1967–1969	17.4	4.8	13.0	23.4	11.0	5.1	21.5	25.3	6.6	18.7	7.5	9.8
Textiles and light industries	1958–1960	22.0	13.8	20.4	24.4	27.1	17.5	31.9	26.5	11.9	23.0	18.5	18.7
	1967–1969	19.6	14.5	20.8	22.4	24.9	20.1	26.4	31.2	13.4	21.1	18.2	19.8
Metal-making	1958–1960	9.8	12.7	17.8	6.9	18.2	14.4	6.0	10.8	12.2	9.0	14.2	16.2
	1967–1969	8.8	9.6	14.4	7.3	15.3	10.8	6.5	7.4	11.3	8.3	11.2	12.9
Metal-using	1958–1960	32.6	46.8	18.4	27.4	21.7	36.4	18.7	9.6	40.4	30.7	38.3	26.5
	1967–1969	32.2	45.1	27.9	28.8	26.5	36.3	23.8	16.7	41.7	30.7	38.5	32.1
Chemicals, rubber, including petroleum and coal products	1958–1960	10.1	13.7	11.5	8.7	11.9	17.9	10.7	11.1	19.5	10.0	13.1	14.4
	1967–1969	14.4	18.8	17.4	11.8	17.0	20.5	13.8	14.8	21.2	13.8	18.1	18.8
Other manufacturing	1958–1960	6.8	7.8	6.2	6.1	5.4	7.7	6.0	3.6	4.9	6.7	7.0	6.7
	1967–1969	7.6	7.2	6.5	6.3	5.3	7.2	8.0	4.6	5.8	7.4	6.5	6.6
Total manufacturing industry[b]	1958–1960	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1967–1969	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTE.—For branch classification see notes preceding table 3.1.

[a] See text for specification of countries included in the three groups.

[b] Gross output in 20 branches added without eliminating inter-branch deliveries.

TABLE 3.8

Eastern Europe: exports as per cent of gross output and imports as per cent of consumption by industrial branches

A = 1955–1957 B = 1960–1962 C = 1968–1970

	Bulgaria				*Czechoslovakia*				*Hungary*				*Poland*				*Soviet Union*			
	Exports		*Imports*		*Exports*		*Imports*		*Exports*		*Imports*		*Exports*		*Imports*		*Exports*		*Imports*	
	(A)	(C)	(A)	(C)	(B)	(C)	(B)	(C)	(A)	(C)	(A)	(C)	(A)	(C)	(A)	(C)	(A)	(C)	(A)	(C)
Food, drink, tobacco	15	30	1	11	4	5	8	9	14	21	5	9	10	16	2	6	2	2	4	3
Textiles	31	7	22	25	15	13	7	9	27	30	3	11	10	10	5	7	1	1	6	14
Clothing	23	29	—	3	7	5	1	5	4	28	—	4	1	19	1	2				
Leather and footwear	14	14	2	11	14	20	1	8	5	35	1	7	—	15	4	7				
Wood	6	10	—	6	12	10	4	6	6	19	32	32	6	8	1	4	3	5	2	3
Pulp and paper	1	3	46	42	13	12	4	14	—	5	38	44	8	2	14	18	2	2	2	2
Printing	3	11	8	11	11	8	5	3	9	7	7	5	..	..	..	..	..	..	..	..
Chemicals and rubber	17	16	50	38	10	12	19	19	23	30	47	39	11	13	31	18	3	3	4	4
Fuels[a]	11	3	35	51	8	7	14	17	5	7	30	28	44	19	15	21	5	8	3	1
Construction materials	6	3	4	5	5	6	4	4	5	7	1	5	5	5	7	9	—	—	1	1
Ceramics and glassware	..	..	..	..	42	46	10	10	..	..	..	..	18	16	9	9	—	1	—	—
Iron and steel[b]	17	18	78	59	17	21	34	32	19	43	23	41	19	25	24	41	12	13	3	4
Non-ferrous metals[b]	100	32	100	30									71	31	78	65	7	9	15	6
Metal-using industry	8	24	55	51	24	25	13	18	36	40	20	38	13	18	30	20	4	3	6	5
Miscellaneous	3	4	3	4	—	—	1	1	8	12	7	11	12	7	10	6	1	1	1	1
Total industry[c]	17	21	20	28	13	14	11	14	17	27	15	25	15	15	13	15	3	3	4	5

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[a] Including coal and crude petroleum extraction.

[b] Including mining of ores.

[c] Including electricity generation, not shown separately in the table.

TABLE 3.9

Western Europe: exports as percentage of gross output (A) and imports as percentage of consumption (B) by industrial branches in west European countries[a]

ISIC N°	Branch	Period	Four large countries (A)	Four large countries (B)	Seven small developed countries (A)	Seven small developed countries (B)	Five less industrialized countries (A)	Five less industrialized countries (B)	Total sixteen countries (A)	Total sixteen countries (B)
20	Food processing	1958–1960	3	12	17	6	11	7	7	11
		1967–1969	4	10	18	8	12	7	8	10
21	Beverages	1958–1960	11	12	5	7	24	2	11	10
		1967–1969	16	9	7	12	19	4	15	9
22	Tobacco products	1958–1960	4	1	4	4	–	2	3	2
		1967–1969	6	3	14	13	1	4	7	5
23	Textiles	1958–1960	16	8	33	36	6	7	17	12
		1967–1969	23	17	59	61	14	14	27	24
24	Footwear and clothing	1958–1960	7	3	8	12	3	1	7	5
		1967–1969	16	11	21	31	12	3	16	14
25	Wood and wood products	1958–1960	5	23	50	28	26	12	19	23
		1967–1969	6	22	35	25	23	19	13	22
26	Furniture	1958–1960	3	1	6	5	3	–	3	1
		1967–1969	6	4	17	16	5	1	8	6
27	Pulp and paper	1958–1960	6	19	76	41	6	19	23	21
		1967–1969	9	24	78	53	10	21	28	27
28	Printing	1958–1960	4	2	4	4	5	3	4	2
		1967–1969	7	4	8	9	8	8	8	5
29	Leather goods, excluding footwear	1958–1960	12	9	14	23	8	4	12	11
		1967–1969	21	18	31	38	21	14	23	21
30	Rubber products	1958–1960	13	3	23	30	4	19	14	8
		1967–1969	20	9	44	46	8	15	22	14
31	Chemicals	1958–1960	19	10	34	40	6	23	20	16
		1967–1969	26	18	53	56	11	29	29	25
32	Petroleum and coal products	1958–1960	28	26	47	60	15	24	31	36
		1967–1969	24	23	51	58	14	17	28	30
33	Non-metallic mineral products	1958–1960	9	4	20	18	4	5	11	6
		1967–1969	10	7	19	20	4	7	11	9
34	Base metals	1958–1960	18	17	70	64	14	26	25	23
		1967–1969	21	22	74	66	12	28	29	28
35	Metal products	1958–1960	11	3	17	17	4	10	12	5
		1967–1969	13	6	21	22	7	10	14	10
36	Non-electric machinery	1958–1960	28	12	30	40	7	50	28	19
		1967–1969	42	26	41	48	17	60	41	34
37	Electric machinery	1958–1960	18	5	30	35	8	29	19	12
		1967–1969	21	13	40	44	14	32	24	20
38	Transport equipment	1958–1960	23	4	22	34	4	23	22	11
		1967–1969	27	11	43	50	6	19	27	19
39	Miscellaneous industries	1958–1960	24	15	29	43	8	28	24	21
		1967–1969	25	18	44	54	8	22	26	24

Source: See notes to table 3.8. [a] Trade data include of course trade within the country groups.

declined drastically in the 1960s as did also the share of beverages, wood, pulp and paper and base metals in their total imports. The share of textiles and clothing, chemicals and engineering goods increased steeply. The import structures in the other two country-groups changed only moderately. In each group there was a convergence between the trade structures and the output structure over the period; for the export structure it was most pronounced in the five less industrialized countries, for the import structure, most pronounced in the four large countries:

Similarity indices[a]

	Exports/output 1958–1960	*Exports/output* 1967–1969	*Imports/output* 1958–1960	*Imports/output* 1967–1969
Four large countries	75	78	72	80
Seven small countries	72	76	67	72
Five other countries	73	83	59	63

[a] Based on 20-branch distribution.

TABLE 3.10

Trade in selected industrial products between 16 west European countries in 1959 and 1968

Bilaterally balanced component (exports plus imports), export surpluses and import surpluses as percentage of turnover

Country[a]		*Chemical*			*Textiles*			*Machinery*		
		Bilaterally balanced	*Export surpluses*	*Import surpluses*	*Bilaterally balanced*	*Export surpluses*	*Import surpluses*	*Bilaterally balanced*	*Export surpluses*	*Import surpluses*
Federal Republic of Germany	1959	43	57	—	45	15	40	37	63	—
	1968	59	41	—	67	11	22	43	57	—
France	1959	69	21	10	32	68	—	44	7	49
	1968	74	10	16	75	19	6	57	6	37
United Kingdom	1959	64	25	11	44	40	16	42	54	4
	1968	69	21	10	62	23	15	60	30	10
Italy	1959	46	12	42	35	65	—	42	16	42
	1968	62	9	29	58	42	—	60	24	16
Netherlands	1959	68	16	16	57	17	26	53	3	44
	1968	84	14	2	78	8	14	61	3	36
Belgium - Luxembourg	1959	68	16	16	49	43	8	56	8	36
	1968	83	9	8	66	33	1	63	8	29
Sweden	1959	42	5	53	21	2	77	50	21	29
	1968	54	3	43	39	2	59	68	17	15
Denmark	1959	29	3	68	21	5	74	52	16	32
	1968	59	6	35	32	11	57	71	11	18
Austria	1959	27	6	67	67	12	21	32	6	62
	1968	26	6	68	53	13	34	44	6	50
Norway	1959	47	28	25	15	—	85	23	1	76
	1968	73	12	15	16	—	84	44	1	55
Finland	1959	8	—	92	10	3	87	2	—	98
	1968	28	1	71	45	2	53	37	1	62
Spain	1959	35	5	60	—	55	45	4	—	96
	1968	29	2	69	68	6	26	8	2	90
Yugoslavia	1959	18	—	82	29	—	71	—	—	100
	1968	31	—	69	55	1	44	2	—	98
Portugal	1959	42	6	52	13	27	60	—	—	100
	1968	31	—	68	42	49	9	4	—	96
Ireland	1959	5	—	95	35	—	65	15	—	85
	1968	29	—	71	66	2	32	13	—	87
Greece	1959	10	—	90	—	—	100	—	—	100
	1968	31	1	68	34	4	62	—	—	100

[a] Countries listed within each group according to trade turnover (total of three branches in 1968).

Sectoral trade proportions

As was shown in chapter 2, manufacturing output has grown appreciably faster in eastern than in western Europe while there was little difference between the two regions with respect to export and import growth. Consequently, the shares of exports in manufacturing output, and of imports in consumption of manufactures, increased less in eastern than in western Europe and remained in the late 1960s appreciably smaller. This was also the situation in the individual branches. The estimates of sectoral trade proportions given in tables 3.8 and 3.9 show that in each of the three groups of west European countries both export and import shares increased in practically all branches whereas in the five east European countries cases of falling trade shares were numerous; 57 of the 134 trade shares shown in table 3.8 fell or remained unchanged. In the late 1960s most sectoral trade shares were in general higher in western than in eastern Europe.

In *eastern Europe*, while each country aims at the development of a complex and comprehensive industrial structure, it is recognized within the CMEA that countries should also aim at specialization within each branch. This would show up statistically in increasing both export and import shares. The scope for intra-branch specialization, with simultaneously high export and import shares, is particularly great in the chemicals, metal-making and metal-using industries. In eastern Europe the following branches displayed in the late 1960s both an export share of production and an import share of consumption of 25 per cent or more:

Bulgaria: non-ferrous metals
Hungary: chemicals, metal-making, metal-using
Poland: metal-making.

Coincident import and export shares of between 15 per cent and 25 per cent were found in:

Bulgaria: chemicals, steel, metal-using
Czechoslovakia: metal-making, metal-using
Hungary: wood products
Poland: fuels, metal-using.

These cases of apparent intra-branch specialization are similar to those for the west European countries, except that in the latter textiles, clothing and leather goods also feature.

For *western Europe* sectoral trade proportions are not shown for each individual country but for three groups of countries only, selected so as to demonstrate the effect of size and the level of development on trade dependence. The seven small industrial countries are obviously more dependent on foreign trade than either the four large or the five less industrialized countries.[92] This holds for all branches with only three exceptions: (*a*) food processing where the four large countries are more dependent on imports than the other two groups; (*b*) beverages, where both the four large countries and the five others have higher export shares than the small industrial countries and (*c*) non-electric machinery where the four large countries have a somewhat higher *export* share and the five others a significantly higher *import* share than the seven.

The four large countries have their highest export dependence in the non-electric machinery industry; according to the estimates presented in table 3.9 the export share increased from 28 per cent in 1958–1960 to 42 per cent in 1967–1969. This means that three-quarters of the increment in output between these two periods were exported. At the same time imports into these four countries increased even faster, accounting for 26 per cent of consumption by 1967–1969 (12 per cent in 1958–1960). This implies that two-thirds of the increment in consumption consisted of imports. Imports increased strongly in relation to consumption in most branches in the four large countries, both in light industries and/or consumer-goods industries (textiles, clothing, furniture, leather goods, motor-cars) and in the machinery industries.

They remained, however, net exporters in all branches except the raw-material intensive ones: food processing, wood, pulp and paper, petroleum products, basic metals (on account of non-ferrous metals). The high share of imports in consumption of non-electric machinery already referred to is particularly significant. In this, as well as in other engineering industries, a significant proportion of the fast growth of international trade consists of an exchange of components and semi-finished products between manufacturers. This trend can be illustrated by the proportion of total inputs in the machinery industry (excluding domestic intra-industry deliveries) accounted for by imported inputs from machinery industries abroad:

	Percentages	
	1959	*1965*
Federal Republic of Germany	5	6
United Kingdom	..	6[a]
France	3	7
Italy	2	10
Norway	13	23
Belgium	12	28
Netherlands	26	41

Sources: For 1959 and for the United Kingdom in 1963, *ECE Standardized input-output tables*; for later years, national input-output tables.

[a] 1963.

While this type of international specialization is more important for the smaller industrial countries, a recent investigation in the United States also reveals large and growing import shares of parts and components consumed in industries producing durable end-items.[93] Total imports of parts and components increased from $850 million in 1965 to $3,300 million in 1969, including

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[92] In the seven small industrial countries taken together, export and import shares are very high in most branches and generally not very different (see table 3.9.) In several branches this situation results partly from complementarity of the individual countries (specialization between such branches as textiles, wood, paper and basic metals) and partly from a high degree of intra-branch specialization, which notably characterizes the chemicals and engineering industries.

[93] US Department of Commerce, *Overseas Business Reports*, OBR 70-85, Washington, D.C., December 1970.

$1,100 million under the United States—Canada Automotive Products Trade Act. Canada supplied also many other parts and components as witnessed by the fact that fully 60 per cent of all United States imports of parts and components originated in Canada. The share of imports in total consumption of parts and components by selected industries is shown in the text-table below:

Import share of parts and components consumed by selected United States industries producing durable end-items, 1965 and 1969

(Percentage)

Industry	*Imports as share of consumption of parts and components* 1965	1969
Manufacturing capital goods		
Textile manufacturing machinery	11.3	22.5
Pulp and paper manufacturing machinery	4.7	10.6
Agricultural machinery, including tractors	6.8	8.5
Printing and bookbinding machinery	2.9	4.8
Transportation equipment		
Motor-cycles and bicycles	16.9	20.0
Boats	3.4	19.2
Motor-vehicles	0.2	7.6
Aircraft	3.0	3.6
Other capital goods		
Scientific instruments, optical	11.2	12.2
Business machines	1.4	4.8
Consumer durable goods		
Home sewing machines	27.3	55.0
Watches and clocks	22.4	20.1
Eye-glasses	11.6	18.4
Musical instruments	10.2	12.0
Home electronics equipment	3.5	11.3
Games, toys and dolls	5.1	8.3
Photographic equipment	4.9	6.3
Light fixtures and lamps	1.9	2.5

NOTE. — Shares are ratios of the estimated minimum value of the imports to the estimated maximum value of all parts and components brought into the plants producing the end-items.

Source: US Department of Commerce, *Overseas Business Reports*, OBR 70-85, Washington, D.C., December 1970.

As most trade in manufactures takes place between industrial countries, so most trade in parts and components is between these countries. The fast growth of imports of manufactures into highly industrialized countries accounts for much of the continued high trade elasticities characterizing post-war economic growth.

As one indication of the relative importance of intra-branch and inter-branch trade,[94] a simple exercise has been conducted on the 1959 and 1968 export data of 16 west European countries for three commodity groups: (*a*) textiles (SITC 65, corresponding reasonably well to ISIC 23), (*b*) chemicals (SITC 5, about the same as ISIC 31), and (*c*) non-electric machinery (ISIC 36). In table 3.10 only trade between each pair among these 16 countries is considered: for example, exports of chemicals from the Federal Republic of Germany to France and exports of chemicals from France to the Federal Republic of Germany. This trade can be either balanced or result in an export surplus for one of the two countries (an import surplus for the other). Summing up within each branch for each country the bilaterally balanced component (multiplied by two to give turnover), the export surpluses and the import surpluses yield the data in table 3.10, where the three components are expressed as a percentage of each country's imports plus exports. In most countries, bilateral export and import surpluses have declined in relation to turnover; hence the bilaterally balanced component increased practically everywhere for the 16 countries taken together as follows:

Bilaterally balanced component (exports plus imports) as a percentage of turnover in trade between 16 countries

	1959	*1968*
Chemicals	50	65
Textiles	41	64
Non-electrical machinery	40	50

Thus in Belgian and Dutch trade in chemicals with the rest of western Europe over 80 per cent is bilaterally balanced; very high proportions are also found in France, Norway and the United Kingdom. In the textiles industry two-way trade is most important in the Netherlands, France, Spain, the Federal Republic of Germany, Belgium-Luxembourg and Ireland; in the non-electrical machinery industry in Denmark, Sweden, Belgium-Luxembourg and the Netherlands. These developments indicate the growing intra-branch specialization among these countries—in other words the increasing integration of the west European industries.[95]

(iii) The construction sector

The construction industry played a key role in European development, producing over half of capital investment,[96] and in most countries was under heavy pressure for long periods. Over the past two decades, the rate of output growth ranged between 4 and 7 per cent a year in most of western Europe and between 6 and 10 per cent in eastern Europe—in most countries somewhat in excess of the GDP growth rates. Employment increases were moderate in industrial western Europe but rapid, in relation to total employment, in the eastern and southern countries. Labour productivity increased most, generally by 4 to 6 per cent a year, in eastern and southern Europe; in western Europe the average was less than 3 per cent.

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[94] The distribution between these two forms of trade obviously depends on the degree of disaggregation of the trade data. However, even the finest classification is unlikely to reduce intra-trade to zero, since even homogeneous products may be differentiated by time (seasonal imports of vegetables) or location (border trade in building materials).

[95] Some comments on trade in "research-intensive" products will be found in chapter 8.

[96] Buildings and other construction represented from half to two-thirds of total gross fixed capital formation in all European countries in 1950–1969.

Construction accounts (in terms of added value) for about 7 to 9 per cent of GDP in western Europe—an increase of one or two percentage points since the early 1950s. In most of eastern Europe the share is 8 to 10 per cent of net material product, and has risen by four or five percentage points.

Productivity levels and changes in construction, and the differences in them between countries, are much affected by the composition of output. Thus output per worker in civil engineering work may be twice as high as in house-building, and in new construction work generally is much higher than in repair and maintenance. The increasing share of maintenance work in the total output of the construction industry proper[97] has tended to obscure major advances in productivity in new construction. Around 1960, the proportion of repair and maintenance work in the gross output of the construction industry was around 10 to 15 per cent in most European countries, but rising to over 20 per cent in France and the Netherlands and 30 per cent in the United Kingdom.[98]

Rough estimates suggest that the *gross* output of all construction activity is a major proportion of national output: some 15 to 20 per cent of GDP around 1960 in western Europe and some 25 per cent of NMP in eastern Europe. These proportions increased through the 1960s. In western and southern Europe new construction work alone rose on average from around 12 per cent of GNP in 1960 to some 14 per cent in 1968. In eastern and western Europe, about one-fifth of total resources is generally spent on construction investments and services. The impact of construction on the rest of the economy is large not only because of its relative size but also because some 40 to 60 per cent of gross output value represents purchases of materials and services from other sectors (the proportion varies widely according to the composition of output). These inter-relationships are illustrated by input-output data for the area of the European Economic Community.

The relative importance of expenditure on transport is greater than suggested here, mainly because much transportation is done by the construction enterprises themselves.

Foreign trade in building components is still hampered by international differences in building regulations and standards as well as by high transport costs and other traditional trade barriers. However there is widespread trade in building materials and in equipment for installation in buildings: the Netherlands and Belgium, for example, import one-third and one-fifth respectively of their total requirements of building materials and equipment.

Interrelationship between construction and other sectors in the EEC around 1959

	Share of total purchases from other sectors	*Proportion of sector's total output purchased by construction*
Mining and quarrying (excluding coal)	2.4	9.3
Wood products, paper	11.7	10.2
Chemicals	4.0	3.6
Non-metallic mineral products	29.4	61.2
Metals	12.0	7.7
Machinery and other manufactures	14.1	5.1
Trade	7.4	2.6
Transport and communication	6.5	4.2
Non-material services	6.3	2.9
Other sectors	6.2	—
Total purchases	100.0	—

Source: ECE standardized input-output tables.

Overseas contracting has grown significantly in the post-war period, and although the international market is still dominated by United States contractors (1 to 1.5 billion dollars of overseas construction a year), firms from France and the United Kingdom ($400 million each of overseas construction a year), Italy ($300 million), the Federal Republic of Germany ($100 million) and Japan ($100 million) are increasingly active.[99] Most of this work consists of civil engineering projects in developing countries. For western Europe as a whole overseas construction is estimated at between 1 and 3 per cent of gross construction output; this figure excludes royalties and management fees which may be even more important but for which precise data are not available. In the housing sector, there is also a growing trade in building systems.

Technical change and industrial organization

Major technological advances have been made in construction methods. Civil engineering, in particular, has been transformed from a labour intensive activity to a highly mechanized one using scientific methods of planning, design and control. Concrete technology has advanced considerably and pre- or post-stressed components have achieved widespread application. In most European countries operations such as excavation, earthmoving and preparation of road surfaces were fully mechanized by the end of the 1960s.

Less spectacular but nevertheless important technical progress has occurred in the building sector. Brickwork was gradually replaced by concrete in many applications and a number of traditional materials (such as wood) were displaced by steel, plastics and light metals. This substitution process is expected to continue in the 1970s. The major advances have been the transfer of many building operations from the site to fixed or semi-permanent factories and the mechanization of many site operations. The range of standardized, mass produced components now covers virtually every part of all types of building. In addition, "house factories" producing standardized complete buildings account for a sizeable share of total output, particularly in eastern Europe (in the Soviet Union there are about 300 such prefabrication plants). Recent efforts have been directed toward the rationalization and mechanization of finishing operations. The work on the site has become less arduous through extensive mechanization of handling and transport operations and the use of better hand tools. As a result, in many countries the construction time per unit of output has fallen by some 20 to 30 per cent over the past decade; the decrease has been even greater for large-panel construction.

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[97] i.e. enterprises mainly engaged in construction, as distinct from the ancillary activities of other sectors.

[98] Calculations based on ECE standardized input-output tables.

[99] The figures given are general order of magnitude and fluctuate greatly from year to year.

The dispersal of building sites, the importance of transport and the unpredictability of the weather all serve to hamper the effective planning and management of the production process. The acquisition of land and the fulfilment of legal and planning requirements makes the design and execution of a project a long process requiring a number of different skills. Another impediment to effective organization is that in most cases no single person or body has control over the whole process.

The size of enterprises in the construction industry varies greatly according to market organization and the composition of output. On the whole, small units predominate in the west. The influence of the product mix is important: in the United Kingdom, for example, civil engineering firms are on average about 15 times larger than firms in the building sector. In France (1959), only 30 per cent of the labour force in civil engineering was employed in firms of less than 100 employees while in building the proportion was 75 per cent. By the end of the 1960s, 60 per cent of all construction output in France was performed by enterprises of less than 100 employees; the corresponding proportion for the Federal Republic of Germany was 55 per cent, for the United Kingdom 40 per cent and for Sweden 30 per cent.

In eastern Europe, on the other hand, the building organizations are usually very large units, partly reflecting the widespread use of industrialized building techniques. In Czechoslovakia national enterprises constructing new buildings employ between 2,000 and 15,000 persons while communal corporations responsible for maintenance and repairs generally employ between 500 and 1,500. In Hungary (1961) national enterprises employed, on average, about 1,000 persons but enterprises with 3,000 were not unusual. Concentration increased in the 1950s and reached a peak toward the end of the 1960s—in Hungary the average number of employees per undertaking doubled between 1950 and 1961.

Public policy and the construction industry

For many reasons, the construction industry is particularly sensitive to governmental policies and regulations. Considerations of health, safety and the environment involve a large number of complex laws and regulations to enforce standards. The demand for new construction is also very sensitive to monetary and fiscal policies as well as being directly affected by government expenditures on public buildings and works. Moreover building contractors themselves are very vulnerable to disturbances in their cash flow since the ratio between their own capital and annual turnover is usually very low.

For a long time, moreover, governments have had a direct influence on construction activities as one of the industry's main customers. In the post-war period, government intervention acquired a new dimension when it was realized that the building industry could not without help develop its capacity in step with the high and sustained demands imposed by all sectors of the economy. Acute shortage of key materials and skilled labour, fast-climbing building costs and undue delays in completing building projects were clear indications that the traditionally organized building market had reached a stage of excess pressure which called for action by governments. Measures to reduce building costs became specially urgent because of the ambitious social housing programmes launched in most countries after the war and the increasing financial burden of housing subsidies. As a preliminary measure, many governments introduced legislation restricting demand or rationing resources by some kind of licensing system. Policies were also applied with a view to promoting a better use of available physical resources by encouraging year round construction and by rewarding systematic efforts to eliminate waste of materials in the production process. Most governments went one step further into the technical field by sponsoring or supporting building research and development work. In many countries direct assistance was given by governments to help enterprises introducing new building techniques, especially those based on prefabrication. In eastern Europe, as has been noted, a whole range of technical policies was introduced with a view to shifting the maximum amount of building work from sites to factories.

In the course of the efforts to "industrialize" construction it became increasingly clear that some of the main obstacles to improved efficiency in construction were not of a technical nature but were to be found in the institutional and legislative framework governing construction activities. Thus, in all countries, building laws and regulations were thoroughly revised, up-dated and—to a larger or lesser extent—unified. Standardization of building products was promoted as a prerequisite for a rational production and use of industrially made components. Annual budgetary allocations for construction purposes were gradually replaced by longer-term financing schemes or rolling plans. A better continuity of demand was also promoted by the stimulation of co-operation between clients with similar building programmes and by the unification, as far as possible, of users' requirements. Finally, the intricate and controversial question of contracting procedures, especially for public expenditure, was subjected to careful scrutiny.

In the medium-term development plans of eastern Europe, construction continues to occupy a prominent place, but in addition to catching up quantitative backlogs there is increasing emphasis on better quality and on the maintenance and modernization of the existing building stock. In western Europe, total construction demand may be expected to remain high, although its pattern will continue to be influenced by short-term fluctuations in the individual components of demand. More resources are generally expected to be used for urban renewal programmes.

The capacity problem has been largely overcome in Europe and increasing interest is now being given to international trade in building products and equipment as a means of achieving further rationalization and greater productivity. However for this development to proceed, much international collaboration will be needed to harmonize national building regulations and standards.

CHAPTER 4

STRUCTURAL CHANGE IN AGRICULTURE [100]

Economic growth in Europe has been associated with a steady decline in the share of agriculture both in total output and in total employment. In industrial western Europe, the volume of output (value added) has been rising at rather less than 2 per cent a year since the early 1950s, the rate varying from half of one per cent a year in Sweden and a decline in Norway to an increase of about 2.5 per cent in the Netherlands and the United Kingdom; in southern Europe the growth has been rather faster—around 3 per cent in most countries. Rates of increase in gross output have generally been greater—about 3 per cent a year in western Europe as a whole.[101] In eastern Europe, the range of increase is rather wider—from a net decline in Czechoslovakia to an increase of about 4 per cent a year in the Soviet Union; again gross output has increased rather faster, probably by about 4 per cent a year in the area as a whole. (See tables 4.1 and 4.2 for the country data on which this discussion of trends in output, employment and agricultural shares of the economy is based.) In both east and west, the increase in agricultural output has been about one-third to one-half of that in total GDP—a relationship which is broadly consistent with the usual ratio of the rise in demand for food (at farm-gate value) to that in total private consumption, allowing for the changes in foreign trade.

Growth of gross agricultural production

Per cent a year compound

	1948–1952 to 1958–1962	*1958–1962 to 1966–1970*	*Projected for 1966–1970 to 1980*
Western Europe	3.3	2.4	1.9
Soviet Union and eastern Europe	4.9	3.1	2.7

Sources: Derived from FAO, *Agricultural Commodity Projections 1970–1980*, vol. 1 (Rome 1971); FAO, *Monthly Bulletin of Agricultural Economics and Statistics*, vol. 20, January 1971; FAO work-sheets for agricultural projections. The projections in the first source exclude forestry, but this would not substantially affect the totals.

Production projections for the 1970s, based essentially on the continuance of current agricultural policies, indicate some slowing down in the rate of increase in total agricultural output—continuing the slow-down between the 1950s and the 1960s.

To put these projections in a world setting, it may be noted that world agricultural production is projected by the FAO to increase during the 1970s by about 2.5 per cent a year, or by less than half of one per cent a year per head of population.

The decline in agricultural employment has been almost universal in Europe: a decline of about 3.5 per cent a year in industrial western Europe; about 1 per cent a year in southern Europe and about 1 per cent a year in eastern Europe and the Soviet Union. Only in Turkey [102] and Poland has agricultural employment been maintained and more recent developments suggest that a decline is beginning in these countries too.

As a result of the movement out of agriculture combined with technical progress within the sector, output per worker in agriculture increased rather fast, by between 4 and 5 per cent a year in most countries (see table 4.2). In most of industrial western Europe, the growth of labour productivity was indeed substantially faster in agriculture than in the rest of the economy; this was not so, however, in most of eastern Europe, or in several southern countries, where the growth of labour productivity in the rest of the economy was distinctly faster than in the industrial countries of the west.

It seems likely that by about 1980 there will be only a few industrial countries in western Europe where agriculture will employ much more than 5 per cent of the total labour force.[103] In southern Europe and in much of eastern Europe (other than Czechoslovakia and the German Democratic Republic) the agricultural proportions of the labour force are likely to remain much larger. (For a picture of the present geographical pattern of the share of agriculture in total employment, by regions within each country, see map 4.)

Productivity and incomes

In these circumstances, the 1970s should also see substantial improvements in the relative position of the remaining farm population, especially in countries where the proportion of agricultural employment is still large. There can be no certainty about such a forecast. The "productivity" gap (in the sense of added value per worker

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[100] The over-all statistics for agriculture in this section generally cover forestry, fishing and hunting as well as agriculture proper. Trends in forestry are, however, dealt with separately in chapter 5.

[101] The greater rise in gross output—by up to 1 per cent a year depending on the country—reflects the greater use of non-agricultural and imported inputs (fertilizers, feeding stuffs, energy etc.). The value added represents the activity of domestic agriculture alone.

[102] The census criteria for recording active population (especially unpaid family workers) in agriculture are particularly wide in Turkey.

[103] On present trends, however, the proportion may still be about 10 per cent in Austria, Denmark and France and perhaps around 15 per cent in Italy and Finland (note that the figures include forestry in agriculture). See *Economic Survey of Europe in 1969*, part I, tables 2.33 and 3.20.

TABLE 4.1

Structural relationships between the agricultural sector and the rest of the economy

Country and period	*Output share (added value)*		*Employment share*	*Relative output (1963 factor cost) per person employed*	*Relative income (current prices) per person employed*
	at 1963 factor cost	*at current factor cost*			
	Total economy = 100			*Rest of the economy = 100*	
Austria					
1953–1955	14.5	15.9	31.8	36	41
1965–1967	9.1	8.9	20.2	40	39
Belgium					
1953–1955	8.4	8.1	9.3	90	86
1965–1967	5.9	5.8	5.3	113	110
Denmark					
1953–1955	15.9	19.2	25.4	56	70
1965–1967	11.3	10.2	16.6	64	57
Finland					
1953–1955	22.9	24.1	36.6	51	55
1965–1967	16.5	16.4	25.8	57	56
France					
1953–1955	12.3	..	25.9	40	..
1965–1967	9.0	8.3	16.2	51	47
Federal Republic of Germany					
1953–1955	8.3	8.5	18.9	39	40
1965–1967	5.5	5.1	10.7	49	45
Ireland					
1953–1955	22.7	29.6	38.8	46	66
1965–1967	19.8	20.0	31.1	55	55
Italy					
1953–1955	19.1	21.6	35.6	42	50
1965–1967	13.5	12.7	22.8	53	49
Netherlands					
1953–1955	11.6	12.0	13.7	82	86
1965–1967	8.7	7.6	8.3	105	91
Norway					
1953–1955	13.6	13.8	26.3	44	45
1965–1967	7.9	8.2	18.1	38	40
Sweden					
1953–1955	10.2	11.7	20.2	45	52
1965–1967	6.5	6.4	11.2	55	54
United Kingdom					
1953–1955	3.7	5.0	4.8	76	104
1965–1967	3.6	3.4	3.2	112	106

TABLE 4.1 (*continued*)

Structural relationships between the agricultural sector and the rest of the economy

Country and period	*Output share (added value)*		*Employment share*	*Relative output (1963 factor cost) per person employed*	*Relative income (current prices) per person employed*
	at 1963 factor cost	*at current factor cost*			
	Total economy = 100			*Rest of the economy = 100*	
Greece					
1953–1955	31.8	31.6	..	..	..
1965–1967	23.2	24.0	..	..	..
Portugal					
1953–1955	30.6	30.7	45.3	53	53
1965–1967	18.5	20.2	34.9	42	47
Spain					
1953–1955	24.4	22.0	45.2	39	34
1965–1967	17.7	17.3	34.2	41	40
Turkey					
1953–1955	46.6	43.5	..	..	..
1965–1967	36.8	36.6	73.2	21	21
Yugoslavia					
1953–1955	41.0	..	68.7	25	..
1965–1967	24.2	24.0	56.4	20	24
Bulgaria					
1950	39.7	24.0	69.7	29	14
1967	23.3	25.7	41.0	44	50
Czechoslovakia					
1950	25.8	14.5	38.6	56	27
1967	8.1	9.4	19.9	35	42
German Democratic Republic					
1950	14.8	8.2	21.8	62	32
1967	7.3	11.2	15.3	44	70
Hungary					
1950	24.3	18.6	50.1	32	23
1967	11.5	16.4	30.0	30	46
Poland					
1950	30.4	22.3	56.5	34	22
1967	15.0	18.5	41.7	25	32
Romania					
1950	39.9	..	73.5	24	..
1967	21.8	..	54.6	23	..
Soviet Union					
1950	28.9	21.9	48.8	40	29
1967	15.4	17.8	30.5	41	49
United States					
1953–1955	4.3	5.2	9.2	45	54
1965–1967	3.2	3.2	5.2	60	60

Source: Secretariat estimates based on national accounts. For explanation see *Economic Survey of Europe in 1969*, part I, tables 2.33 and 3.20 and L. Danieli "Labour scarcities and labour redundancies in Europe by 1980" in *The Demographic and social pattern of emigration from the south European countries*, Dipartimento Statistico Matematico (University of Florence, 1971).

Table 4.2

Trends in output, employment and output per worker in agriculture and the rest of the economy

(Annual rates, per cent, 1953–1967, for western Europe and United States; 1950–1967 for eastern Europe and the Soviet Union)

Country	Agriculture			Rest of the Economy		
	Output	Employment	Output per worker	Output	Employment	Output per worker
Austria	1.6	—3.3	5.0	5.6	1.7	3.8
Belgium	1.0	—3.9	5.2	3.9	0.9	3.0
Denmark	1.3	—2.5	3.9	4.9	2.1	2.7
Finland	2.1	—1.8	4.0	5.4	2.5	2.9
France	2.1	—1.8	4.0	5.4	2.5	2.9
Federal Republic of Germany	2.2	—3.6	6.0	5.8	2.0	3.7
Ireland	1.3	—2.5	3.8	2.8	0.4	2.4
Italy	2.2	—3.4	5.8	5.3	0.4	4.9
Netherlands	2.5	—3.0	5.6	5.0	1.7	3.3
Norway	—1.1	—2.8	1.7	4.7	1.2	3.4
Sweden	0.4	—4.1	4.7	4.5	1.5	3.0
United Kingdom	2.6	—2.7	5.4	2.8	0.7	2.1
Greece	3.1	—1.3*	..	6.9	..	..
Portugal	0.9	—2.0	2.9	6.5	1.7	4.7
Spain	3.0	—1.7	4.8	6.7	2.4	4.2
Turkey	2.5	1.1*	..	5.9	..	..
Yugoslavia	3.6	—0.8	4.5	10.6	4.1	6.2
Bulgaria	3.3	—3.0	6.6	10.7	5.9	4.6
Czechoslovakia	—1.8	—3.1	1.3	6.6	2.3	4.2
German Democratic Republic	0.6	—2.4	3.1	6.9	0.1	6.7
Hungary	0.5	—2.1	2.6	7.2	3.5	3.7
Poland	2.0	0.1	2.0	8.6	3.2	5.2
Romania	3.0	—1.1	4.1	10.2	4.2	5.6
Soviet Union	3.9	—1.0	4.9	9.7	3.7	5.9
United States	1.1	—3.4	4.6	4.7	3.2	1.5

Sources: As for table 4.1. Output relates to added value at constant prices; employment includes self-employed. Growth rates for western Europe and United States are least square trend rates 1953–1967; for eastern Europe they are exponential rates 1950–1967. Note that the figures for agriculture differ somewhat from those in table 1.8 which relate to a different period.

at constant prices) between agriculture and the rest of the economy has been narrowing in many countries, especially in the industrial western countries, since the early 1950s; but the "income gap" (in the sense of added value per worker at current prices) has not been closed and in some countries has widened despite falling agricultural employment (see table 4.1).[104] In most countries, it appears from these measures, that productivity and income gaps are still large (exceptions are Belgium, the Netherlands and the United Kingdom, where the agricultural shares of employment are very small). In the industrial west, this is because relative output prices have tended mostly to move against agriculture, these prices and consequently agricultural incomes being, of course, influenced heavily by policies of government support to agriculture.[105]

In most countries of eastern Europe, and also in southern Europe, by contrast, relative price developments were favourable to agriculture. It must be observed, however, that the initial price relationships were set to encourage industrial expansion. Thus, in contrast to the industrial west, agricultural productivity rose less than in the rest of the economy but incomes rose faster.

The future course of the income gap depends on a variety of factors, of which probably the most important are the pull of demand for labour from other sectors of the economy, the pattern of agricultural support policy and the course of technical progress in agriculture itself.

Structural change

While the labour force has been steadily declining, the agricultural area in most countries changed little during the last 15 to 20 years so that the land/labour ratios generally improved. Much more important for the structural changes within the sector was the increase in capital intensity per unit of land and, more important, per unit of labour. Fully comparable international

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[104] For a fuller account see *Economic Survey of Europe in 1969*, part I, p. 98 ff.

[105] Direct public expenditure for agriculture (excluding non-budgetary support through the operation of import levies and restrictions) is estimated at around 12 to 20 per cent of the value of agricultural output in most western industrial countries. See *Inflation: the present problem*, OECD, Paris 1970, annex C.2, table 16.

TABLE 4.3

Intermediate inputs of the agricultural sector in total and from main supplying sectors as percentages of gross agricultural output

Country	*Year*	*Energy*	*Food processing (incl. processed feed)*	*Chemicals*	*Machinery and vehicles*	*Trade and transport*	*Total input (material sectors)*	*Total input (including services)*
Austria	1961	2.9	2.6	3.7	4.5	4.4	20.4	23.7
Belgium	1959	1.8	17.9	5.0	1.2	3.6	30.9	33.7
France	1959	2.7	6.6	4.6	3.5	1.6	22.1	26.2
Federal Republic of Germany	1959	3.1	9.9	4.8	5.7	4.3	31.3	33.1
Italy	1959	1.8	3.4	3.7	0.4	1.4	11.5	13.6
Netherlands	1959	4.6	24.9[a]	5.0	2.6	3.0	41.6	43.6
Norway	1959	2.7	10.4	5.7	0.1	3.8	23.4	24.1
Norway	1965	2.7	14.7	4.1	0.2	4.5	26.8	27.8
United Kingdom	1963	2.8	17.5	11.2	2.7	8.7	48.3	56.2
Portugal	1959	1.0	1.4	7.9	0.9	1.9	14.1	14.1
Spain	1962	1.5	7.8	3.6	1.0	2.8	19.1	23.4[b]
Turkey	1963	0.7	1.0	1.3	0.4	1.5	5.4	9.2
Yugoslavia	1964	1.4	1.0	3.8	1.9	1.4	12.7	—
Bulgaria	1963	1.8	4.6	2.8	2.1	1.9	14.5	—
Czechoslovakia	1962	6.2	10.4	4.8	5.0	3.8	34.2	—
Hungary	1959	1.8	1.8	1.6	3.7	2.3	14.0	—
Hungary	1965	2.8	9.3	4.6	4.6	2.8	28.3	—
Poland	1962	1.8	3.6	3.4	3.6	3.2	19.2	—
Soviet Union	1959	2.8	4.0	1.0	4.9	9.0	22.6	—
United States	1958	3.4	8.3	3.3	1.5	8.4	28.3	38.8

Sources: ECE standardized input-output tables.

[a] This figure may not be comparable with those for other countries.

[b] The total figure appears rather high, depending largely on originally exaggerated values for feed input of industrial origin; a total of about 18–19 per cent would probably be more comparable with the data for other countries.

indicators for capital intensity do not exist,[106] but it may suffice to indicate that between 1950–1952 and 1963–1965, current operating expenses (at constant prices), and gross capital formation (current prices), rose faster than gross output of agriculture virtually everywhere.[107]

A fuller picture of the growing dependence of agriculture on supplies from other sectors can be obtained from the "technical co-efficients" shown in input-output tables (see table 4.3). Cross-country comparison strongly suggests that the inter-sectoral relationships grow in intensity with the rise in income per head. This is also confirmed by the trends observed between 1959 and 1965 in Norway and Hungary. This result is, of course, in part a consequence of the different patterns in agricultural output, and particularly of the relative importance of livestock production. Thus while the agricultural sector, as conventionally defined, appears to be a contracting activity, its importance for economic activity and employment in a number of other sectors tends to increase, reflecting the increasing integration of agriculture with the rest of the economy. The total effects on the economy of an increase by one unit of final demand for output of the agricultural sector tend to be greater at higher stages of economic development, although the specific structural features of an economy can sometimes obscure this correlation.[108]

The decline in the farm population and the increased supply of capital relative to land and labour, largely associated with the growing application of new technology,

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[106] Valuable material on capital intensity per land and labour unit in selected countries was published in *Capital and Finance in Agriculture*, OECD, Paris 1970.

[107] In this period the share of current operating expenses (other than wages) in gross output (at constant prices) rose from 25.5 to 36 per cent in industrial western Europe and from 13 to 16 per cent in southern Europe. In Hungary and Poland (the only eastern countries for which long series are available) the rise between 1957–1959 and 1963–1965 was from 14 to 27 per cent and from 12 to 19 per cent respectively. Current operating expenses on industrial inputs alone increased generally in line with gross output, except in east European countries where they increased more rapidly.

In the same period the share of gross capital formation in gross output (at current prices) rose from 8.5 to 17 per cent in industrial western Europe and remained virtually unchanged (about 11 per cent) in southern Europe (the peak of 14 per cent in the latter group was attained in 1960–1962); in Hungary and Poland (1957–1959 to 1963–1965) the rise was particularly steep—from 10 to 23 per cent and from 10 to 18 per cent respectively. *Sixth Report on Output, Expenses and Income in Agriculture*, vol. I, 1969 (ST/ECE/AGRI/30).

[108] The ECE's standardized input-output tables, when inverted, suggest that an increase of 10 per cent in final demand for output of the agricultural sector would result in increased sales to agriculture by the rest of the economy (assuming constant technology) by: 15 to 20 per cent in most western industrial countries and the United States of America; 10 to 15 per cent in eastern Europe, the Soviet Union, southern Europe and Italy.

Western Europe: indices of growth of agricultural production and trade

(1957–1958 = 100)

	1960–1962	*1963–1965*	*1966–1968*	*1967*	*1968*	*1969*
Volume of production	111	118	129	131	134	134
Volume of imports.	110	119	127	126	128	133
Value of imports.	105	123	129	129	124	138
Volume of exports	120	139	165	164	181	188
Value of exports	116	151	180	182	190	218

Source: State of Food and Agriculture 1970, FAO, Rome, The figures refer to all agricultural products according to the FAO's definition. Turkey is excluded.

have been accompanied by important changes in farm structures and in the organization of production. Irrespective of institutional differences and of the completely different farm structures in western and eastern Europe, the structural changes within the sector have been following everywhere the same direction. There has been a general tendency for the number of farms to decline and for the average size to increase.[109] The large commercial farm is gaining ground in industrial western Europe at the expense of small family farms. In some countries, for instance Spain and France, "group agriculture" is emerging as a way of overcoming the shortcomings of the small family farm. Although in different forms and by different methods, specialization, increasingly combined with horizontal and vertical integration, is making headway in all parts of Europe. The large "combinates" in the eastern countries aim at covering the whole vertical chain of production ending up with marketing activities. Similar effects are obtained in western Europe through contracting arrangements practised by processing or trading companies.

Under the impact of technical progress, the whole character of agriculture has undergone profound changes. The increased application of mechanization, chemicals and biological innovation, combined with structural and organizational improvement and ever closer ties with other sectors, sometimes tends to obscure the demarcation line between agricultural and non-agricultural activities. In some production lines, like poultry and pigs, purely industrial methods have developed to the extent that it is possible to speak of "agriculture without land". All these changes have put new claims on those who wish to remain in agriculture. Farm people have to master increasingly sophisticated production techniques. Those who wish to run farms have to learn how to organize and conduct business; they must be well informed about actual and prospective market developments and be familiar with modern marketing methods.

Trends in international trade

Western Europe's imports of agricultural products accounted in 1969 for over half of world trade in these products. As shown above, the volume of western Europe's imports grew at about the same rate as production, or even more slowly, whereas exports developed much faster.

Western Europe: shares of main agricultural trade flows[111]

	1960–1962	*1963–1965*	*1966–1968*
Percentage of total west European imports			
From:			
Western Europe	36	38	42
of which: from EEC	18	20	25
Eastern Europe	4	4	5
Rest of world.	60	58	53
Percentage of total west European exports			
To:			
Western Europe	67	71	72
of which: to EEC	38	42	45
Eastern Europe	3	5	4
Rest of world.	30	24	24
EEC share of intra-trade in total agricultural trade			
EEC imports	23	26	32
EEC exports	46	50	57

Source: Agricultural trade in Europe, 1971 (ST/ECE/AGRI/38).

The coverage of imports (*c.i.f.*) by exports (*f.o.b.*) rose from 47 per cent in 1960–1962 to 59 per cent in 1968–1969.[110]

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[109] Despite the continuing decline in farm numbers, the average size of commercial farms in western Europe is still small not only in comparison with the huge State and collective farms in eastern Europe, but also in comparison with the United States and Canada. In the late 1960s the average size exceeded 60 ha. only in the United Kingdom, whereas in continental western Europe it was well below 20 ha., compared with more than 200 ha. in the United States and Canada.

The increase in the average size of the State and collective farms in eastern Europe and the Soviet Union has been impressive. Between 1950 and 1969 the average size of collective farms in Bulgaria increased from 232 to 5,148 ha.; in Czechoslovakia from 365 to 626 ha.; in Hungary from 126 to 1,649 ha.; in Romania from 270 to 1,737 ha.; in the Soviet Union from 3,062 to 6,051 ha. The average size of State farms, to quote two examples only, increased from 2,491 to 4,195 ha. in Czechoslovakia and from 12,900 ha. to 21,410 ha. in the Soviet Union.

[110] These percentages are based on a narrower definition of agricultural products than that used by FAO in so far as they do not include all raw materials (hides and skins, natural rubber and textile fibres). The country coverage includes Turkey.

[111] See preceding footnote.

Indices of agricultural production and trade in eastern Europe and the Soviet Union

(1957–1959 = 100)

	1960–1962	*1963–1965*	*1966–1968*	*1966*	*1967*	*1968*
Volume of production	108	113	135	132	134	139
Volume of imports.	124	156	153	163	147	149
Value of imports.	119	158	148	161	142	141
Volume of exports	139	139	181	162	190	190
Value of exports.	132	147	181	167	193	184

Source: FAO, *State of Food and Agriculture 1970.*

In addition to the increased share of intra-trade in western Europe's total trade, changes in the pattern of the main flows of the region have been characterized by the increased relative importance of the EEC countries in both imports and exports. The fast increase in the intra-trade of the six, as a result of the application of the common agricultural policy, is indeed a salient feature of recent trade developments in western Europe. The modest share of eastern Europe changed little.

Trade developments in eastern Europe and the Soviet Union were characterized until 1965 by a fast expansion of imports compared with production and with exports, but the relative movements subsequently underwent important changes. While over half the total agricultural exports continued to be absorbed by the region, the share going to western Europe remained high, with the EEC countries growing in relative importance as customers.

Destination of agricultural exports from eastern Europe and the Soviet Union

(Million US dollars and percentages)

Destination	*1960–1962*	*1963–1965*	*1966*	*1967*
Total (million US dollars). .	2,140	2,360	3,170	3,280
of which: percentages				
to eastern Europe and the Soviet Union. . . .	56	53	57	47
of which, to:				
Soviet Union . . .	13	16	14	15
Western Europe	31	33	31	34
of which, to:				
EEC	14	17	18	19
EFTA	14	12	10	11

Source: Agricultural Trade in Europe, Geneva 1971 (ST/ECE/AGRI/38).

Problems and policies

Although the process of change in agriculture in the last 20–25 years has been much faster than in any earlier period of comparable length, the internal conditions in the sector and its relative position in the economy continue to create serious policy problems. As already shown, in most countries both output and income per person employed in agriculture are still low compared with the rest of the economy. Even in the highly developed countries of the region, more or less important segments of unadjusted and even clearly non-viable agriculture continue to persist.

The slow process of quantitative and qualitative adjustment of human resources in agriculture has always been a major source of economic and social difficulties. To reconcile the steady outflow from farms with the need to raise the level of professional skill and education of those who remain can be a formidable task, particularly in less developed countries; it is complicated everywhere by regional disparities in geographic and economic conditions as well as by the well-known fact that it is the young and capable people who are attracted most by employment opportunities outside agriculture whereas the aged and the less adaptable ones tend to stick to their farms. This has obvious consequences for the composition by age and by skill of the agricultural population and for the whole process of adjustment of the sector.

All countries in Europe have been experiencing difficulties with the modernization and rationalization of their production structures. Progress has been slowest in southern Europe where, generally, highly fragmented agrarian structures go hand in hand with agrarian overpopulation and a relative shortage of capital. But in industrial western Europe, too, the efforts to encourage the creation of production units of adequate size have met many serious obstacles. In eastern Europe and the Soviet Union, where (except in Poland) huge State and collective farms prevail, progress in building up rational production structures has been mainly determined by the possibility of supplying farms with equipment and current industrial inputs as well as by the opportunities for adjusting the volume and quality of employment. Moreover, as increasingly shown in more recent years, there is the complex task of developing the necessary links between farms and enterprises in related branches of the economy.

All countries in Europe have also been experiencing difficulties with the intricate problem of adjusting supply to demand. In southern and eastern countries, which have started from lower levels, aggregate demand for food still grows relatively quickly thus making additional efforts to expand output necessary. By contrast, most western industrial countries have reached the stage where adjustment can be achieved only by controlling actual and potential supply. The way in which countries attempt to solve their internal adjustment problems has a direct bearing on trade in agricultural products and therefore gives rise to important international policy issues.

Agricultural policy-makers have everywhere been faced with a supremely difficult dilemma. On the one hand, they have had to confront the understandable but ever-rising claims of farmers for higher incomes and better social conditions—claims which could most easily be answered in the short run by protection and subsidy, at an immediate cost to the rest of the community. On the other hand, it was evident that lasting solutions, more acceptable to the community as a whole, called for more radical reforms of the structure of agriculture. Such solutions must inevitably be slow to produce results; they involve costs which become greater the lower the level of development; they imply drastic and, to many, unwelcome, changes in the way of life of farmers; ultimately, they mean reduced job opportunities in agriculture—in some countries beyond the probable capacity of the economy to provide alternative employment. It could not be expected that such changes would be accepted without resistance from many of those directly affected. Moreover, the selection of policy objectives in the early post-war years was strongly influenced by balance-of-payments considerations which continued to play a dominant role in southern and eastern Europe, and even in a few industrial western countries. The general tendency to promote self-sufficiency was further strengthened by the feeling of political insecurity generated in the years of the cold war.

It should be added, however, that the policy-makers themselves have not always been quick enough to adapt their views to a rapidly changing internal and international situation; nor have they fully grasped the implications of the technological and economic changes for the future of agriculture and its role in the economy. All this accounted for a somewhat hesitant and non-integrated policy approach. As became clear in the early 1960s, the various social and economic objectives in agriculture were seldom adequately co-ordinated or made fully consistent with the long-term development objectives and needs of the economy as a whole. Consequently, the agricultural policy measures were not always complemented by wider development action; at the same time, the policy approach has not been sufficiently differentiated according to the state and problems of agriculture in different areas and localities. Lack of complementary action has been particularly characteristic of the highly industrialized countries where, until lately, there has been too much reliance on the automatic effects of economic growth.

More recently, however, the approach has begun to change virtually everywhere. The generally insufficient results obtained in earlier years, the heavy cost to the rest of the community, and the increasing dissatisfaction among farmers in many countries, have obliged governments to devote greater attention to agriculture and, in particular, to co-ordinate better the various lines of action by increasingly regarding the basic problems of the sector as an integral part of the development problems of the economy and by making greater use of regional planning. Understandably, it will probably take years before actual policies reflect the full impact of this change in approach in all countries. Moreover, the new look so far has not given much attention, if any, to the wider international aspects of agricultural adjustment. Production and trade objectives continue to be inspired by somewhat narrowly conceived national and group interests, with co-ordinated action taking place only at the level of the sub-regional economic groupings.

In eastern Europe and the Soviet Union the early efforts to expand output and modernize agriculture had been made more difficult by a development strategy dominated by the high priority attached to industry. Even the steps aimed at improving the position of agriculture undertaken in subsequent years remained hesitant and mainly concentrated on technical aspects. However, following the poor performance of the sector in the early 1960s in a number of countries, a bolder approach came to be adopted and was soon strengthened by the reforms in planning and management methods. More recent years have witnessed greatly increased and diversified action to strengthen the technical base of agriculture as well as a whole range of rather important institutional, economic and social changes. Everywhere, there has been a more energetic move to improve the terms of trade of agriculture, to increase economic incentives to producers and to improve their social conditions. The State and collective farms have obtained greater freedom to plan and conduct business as well as to engage in auxiliary activities. At the same time, comprehensive organizational changes have been made to concentrate production in large and well equipped farms, to promote specialization and, increasingly, to assure the vertical integration of production.

Yields in a number of east European countries are now approaching the levels reached elsewhere in Europe.[112] The improved conditions of the soil and the introduction of new varieties have made crops more resilient to variations in climatic conditions. The patterns of output are being diversified and, together with quality, better adapted to a more sophisticated domestic demand. Agriculture still remains a major earner of convertible currencies, and particular attention is being given to the promotion of specialization in products with good prospects for exports to western Europe.

In earlier years, the situation in southern Europe had varied greatly from country to country. In some, an integrated approach to agriculture began to develop fairly soon, while in others the complexity of the problems tended to inhibit government action. By now, however, all countries have adopted medium- and long-term programmes for agriculture, although in some a more

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[112] Average yields of wheat in quintals per ha.:

	1955–1959	*1960–1964*	*1965–1968*
EEC countries	22.1	24.9	27.5
EFTA countries	22.6	26.7	30.9
	1953–1957	*1958–1962*	*1963–1967*
Soviet Union	8.9	10.8	10.6
Bulgaria	14.3	16.9	23.3
Czechoslovakia	19.8	22.9	25.2
Poland	14.1	17.8	20.7
Romania	10.9	12.4	16.6

Sources: Agricultural Statistics, 1955–1968, OECD, Paris; *State of Food and Agriculture*, FAO, 1968.

radical approach to the problem of agrarian structures is clearly necessary. Because of the great dependence on agriculture as a source of foreign exchange, great emphasis is put on policy measures capable of improving export performance. Most southern countries are handicapped by the narrow range of products in which they may hope to retain comparative advantage, and also by competition emerging from non-European Mediterranean countries. Diversification, combined with specialization in carefully selected production lines, together with promotion of quality and the introduction of modern marketing techniques, has become therefore a major preoccupation of governments.

The central problem in the south European countries, however—and the same is true of some more industrialized countries—remains the excess supply of manpower. This illustrates with particular force the need to integrate the improvement of agricultural production methods and structures, and of relative incomes in agriculture, into a more expansive approach to the development of the economy as a whole. An efficient and competitive use of natural resources and modern techniques can hardly be achieved in agriculture if the sector is at the same time to provide adequate employment and a relatively good income to very large proportions of the future working population. It is clear that with up-to-date methods a reasonably prosperous economy can be fed by less than one in ten of its total labour force—a proportion that might be increased, but only to a limited extent, given the circumstances of most European countries, by competitive exports of specialized agricultural products.

The general orientation of policies in the industrial countries of western Europe has also been determined by a mixture of economic, social and political considerations. However, in most of these countries, where a tendency towards over-supply had become apparent already around the mid-1950s, the main emphasis was put on the protection of the economic position of farmers while relatively little attention was devoted to structural problems. The main line of action was confined to the financing of the expanding price or income support schemes increasingly supplemented with import restrictions and export subsidies. Such policies were no doubt beneficial to farmers (although not equally to all categories); but, being unsupported by effective supply control measures or by long-term action on structural problems, they tended to encourage the expansion of output and also to keep going a number of farms whose existence was no longer economically justified. Although self-sufficiency in many commodities has been raised[113] to allow for larger domestic production, virtually irrespective of comparative advantage, surpluses in a widening range of products continued to overshadow the markets thus making the financing of support schemes a self-perpetuating and ever costlier operation which, in addition, has nowhere fully met the demands of the farmers.

It was not before the second half of the 1960s that a change in attitude began to take place, first in Sweden, but then gradually in other countries also. Thus Dr. Mansholt's proposals, submitted in 1968 to the Commission of the European Communities, by their reappraisal of the traditional policies and strong arguments for the need of a comprehensive reform programme adapted to the specific conditions of particular areas, have greatly contributed to the adoption of more energetic measures towards structural reform. However, it should be clear that support policies cannot be expected to undergo substantial changes before tangible results are obtained in greatly reducing the farm population and in carrying out a number of other structural adjustments. Moreover (Sweden being a conspicuous exception), there has been no indication so far that governments intend to discontinue their policies aimed at promoting self-sufficiency in major products, and thus to enlarge the scope for a wider international division of labour in agriculture.

New policy issues for the 1970s

The following paragraphs suggest some of the lines along which policy might develop in the future, if, as seems likely, the more forward-looking and broader approaches continue to gain support.

The coming years are likely to witness a wider interest in agricultural policy. Its importance will be enhanced by the intimate links between a variety of agricultural, economic, social and environmental issues. As already indicated, the whole policy approach to agriculture is beginning to change. Agriculture is no longer regarded as a somewhat isolated sector unrelated to the rest of the economy. Agricultural programmes and policies in the future will be increasingly integrated with general development programmes and policies, especially at the level of individual geographic and economic areas. There is a growing tendency to differentiate policies according to the situation in particular segments of agriculture, and also to separate governmental aid to the modernization and rationalization of the sector from aid which may be required for non-economic reasons. If because of social or other non-economic reasons non-viable farms in some areas have to be maintained, temporarily or even permanently, they should be put under special assistance programmes which do not affect economic relationships throughout the sector. There is indeed growing recognition that the viable and non-viable segments of agriculture cannot be dealt with by applying the same standards and the same policies.

In most countries, the continuing rural exodus, together with efforts to improve the professional quality and the age-structure of the remaining farm population, can be expected to become a major concern of governments. A few recent examples show that wider use will be made

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[113] *Domestic output as per cent of domestic consumption*

	EEC		*United Kingdom*	
	1959/60	*1967/68–1969/70*	*1957/58–1959/60*	*1965–1967*
Wheat	90	109	39	49
Sugar	104	103	26	32
Eggs	90	98	99	99
Poultry	93	99	91	97
Butter.	101	112	. .	10
Beef	92	89	74	87
Pork	100	100	97	100

Source: Statistical Office of the European Communities, *Agricultural Statistics;* and *Agricultural trade in Europe, 1971* (ST/ECE/AGRI/38).

of financial compensation, early retirement schemes and similar devices to encourage elderly farmers, those who run non-viable units, and even other groups, to quit the land.

Particular attention will be given to the creation of attractive alternative employment opportunities increasingly located near the rural communities, especially in the backward areas, so that a switch to a new occupation would not imply for the farm people a complete break with their traditional environment. At the same time, financial aid will be provided more generously to the young wishing to engage in agriculture; and there will be increased action aimed at improving various educational and training facilities as well as other social infrastructures in the rural areas.

It goes without saying, however, that in the less developed countries, notwithstanding these and similar policy measures, progress in adjustment will continue to depend heavily on the rate of structural changes throughout the economy; in some southern countries, the rate of migration of the surplus labour to the industrial countries can also be expected to play an important role.

Consolidation and amalgamation of farms, together with the promotion of new forms of co-operation which would help to overcome certain shortcomings of the one-family holding, is likely to be stimulated much more energetically than in the past in both the industrial and the southern countries. But in contrast with the foreseeable policy trends in southern Europe, in most industrial western countries a further large expansion of the inflow of capital into the agricultural sector as a whole is not likely to be encouraged. In southern Europe and in most east European countries, problems associated with supplying farms with up-to-date equipment and industrial inputs, the improvement of soil conditions and of infrastructure, the development of research, the problems of farm management and similar issues, will continue to call for strong governmental action.

In the countries with a potential labour surplus, the various policy measures outlined above cannot be expected to contribute automatically to a better adjustment of supply to demand. With further modernization and structural improvements, the effects of even substantial reductions of the labour force on the output potential of the sector may well be overcompensated by the rise in output per man. For this reason, some governments have already recognized the need for resorting to reductions of the agricultural area. Decisions in this direction in the future will be supported by the rapidly increasing importance of environmental issues. There is no doubt that the urge for afforestation, expansion of green belts and recreation areas will be putting rising claims on agricultural land—perhaps comparable with the more familiar claims of urbanization and road-building. There is also a growing belief that the special assistance programmes needed for the preservation of small farms in certain tourist areas should be made conditional upon the discontinuation of production for the market.

Environmental and agricultural issues are intertwined, too, in the fight against pollution. Everywhere there is growing pressure for putting an end to the abuse in the use of fertilizers, pesticides, etc., and there is also a growing demand for "clean" food produced without any use of chemicals. The conflict between the desired improvements in productivity of land and of labour and the risks to health inherent in some present methods, will call for difficult decisions. These may well have important effects on methods of production and on the pattern of demand for industrial products, as well as on the volume and prices of agricultural output.

In addition to policy measures which can be expected to contribute to the adjustment of supply to demand in the long run, the introduction of various forms of supply controls of a temporary character seems unavoidable in some critical product areas. As shown by experience in for instance North America and Australia, the choice of control measures is fairly wide.

Finally, the problem of agricultural adjustment in Europe, as the largest food importing region, has its world dimension. The future shape of agricultural production and farm support policies in Europe is a major element determining the market opportunities open for developing countries to expand their exports. It is true that the commodity structures of agricultural production in Europe and the developing world can be competitive only over part of the range. But the overlap, actual and potential, is certainly large enough to be regarded as an essential issue in the future development of European agricultural policies.

It is generally agreed that only comprehensive action consisting of a wide range of measures, backed by a gradual relaxation of price support and similar policies, can be expected to bring a better adjustment of supply to demand. But if, as prevailing trends in a number of countries seem to indicate, there is readiness to resort to more energetic action at home, more will have to be known about what others are doing or plan to do. There is growing need for confrontations of national long-term strategies and production programmes, especially for making it easier for governments to take correct decisions on matters where the effects are slow to mature, or where the original decisions cannot be easily reversed. Such consultations cannot leave out of sight the implications which changes in a wider international setting might have for Europe's production and trade in the future. In addition, whatever the nature of corrective measures in the critical product areas which governments might have in mind, their effect is not likely to meet the situation if all countries concerned are not prepared to co-operate. It is to be hoped therefore that in comparison with past years the 1970s will witness wider and more fruitful European consultations on a number of issues of common interest, on the suitable corrective policy measures and on their possible quantitative and qualitative effect, taking into account the particular circumstances and interests of individual countries.

CHAPTER 5

TIMBER DEMAND AND SUPPLY*

After the Second World War, it soon became evident that a basic appraisal of Europe's future timber needs was necessary. "Post-war Europe is confronted with a grave timber problem", began the preamble to the report of the International Timber Conference held in 1947, which concluded that "there would be a continuous deficit of timber in Europe". This was also, at that time, the assumption on which most European governments based their policies, and which led to the widely shared belief that timber consumption would decline and that Europe's wood resources were fully extended.

Consequently, the ECE, in collaboration with the FAO, examined more closely these generally accepted assumptions in a study of European Timber Trends and Prospects (hereafter referred to as ETTS I),[114] intended to throw light on future developments of Europe's wood economy. The topic was considered particularly suitable for assessment on an all-European level, partly because wood is one of the principal industrial raw materials in which Europe was traditionally almost self-sufficient, and partly because the very nature of forest resources and their management represents an obvious need for long-term planning in an international context.

This study, published in 1953, showed that Europe's consumption of forest products could reasonably be linked with a number of economic growth factors and other parameters, and that the region's total consumption of most forest products could be expected to exhibit a continuous increase, although per capita consumption rates could vary considerably. The study also concluded that Europe's wood production potential was not fully used and that the supplies could be further increased through a new "dynamic forest policy".

Time confirmed the basic findings of ETTS I, and with the approach of 1960, the target year of the study, the usefulness and value of ETTS I had generally been accepted in the countries of the region as a valuable guide for governments in formulating policies for the development of forest products and for a more dynamic use of the production potential of the existing forest resources. Consequently, two further studies were carried out and published, ETTS II [115] in 1963 and the Interim Review [116] of ETTS II in 1969. These are the main sources for the following description of developments in Europe's wood economy up to 1970 and the projections for the future.

Pattern and growth of demand for forest products up to 1970

Europe's total consumption of forest products between 1913 and 1950, although severely distorted by the two wars, had not shown any consistent tendency either to rise or to fall. From 1913 to 1950, total wood consumption in Europe (excluding the Soviet Union) had shown little increase—(rising from 274 million m^3 to 297 million m^3) and even the consumption of industrial wood [117] had risen by only 22 per cent (from 138 million m^3 to 169 million m^3). The general pattern of consumption by main end uses seemed to have changed much less than was normally assumed, even the use of wood for fuel. In the Soviet Union, the level of consumption had fallen sharply after the First World War and caught up with pre-war levels only towards the end of the 1930s, again without any major change in the basic pattern of consumption.

In the 1950s, however, a steady upsurge in consumption took place in both Europe and the Soviet Union. This was generally considered as an adjustment to more normal consumption levels after the artificially low levels in the immediate post-war period. But a further appraisal of developments up to 1960 (in ETTS II) demonstrated clearly that there had in fact been a general and fundamental change in the rate of growth of timber requirements. This stemmed from an equally important shift in the pattern of consumption.

While wood continued to be used mainly in sawn or round form, the steady trend towards more economical use of wood in these forms, and the substitution of wood by other materials such as concrete, plastics and metal, all but offset the rise in the volume of work for which wood could be used. The rapid growth of consumption of wood-pulp and its products, and of wood-based panels, had little effect on the total as long as these accounted for only a small part of the total use of wood. But these two groups, which in 1950 made up only a little more than a fifth of all industrial roundwood used, in 1960 accounted for over a third and in 1970 for about one-half.

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* Because of the size and different conditions of the timber economy of the Soviet Union, and because of differences in the statistical information and projections available, data for the Soviet Union in this chapter are given separately from those for the rest of Europe. The expression "Europe", following usual practice in ECE/FAO reports about timber, is used here to denote Europe excluding the Soviet Union.

[114] ECE/FAO, *European Timber Trends and Prospects* (1953).

[115] *European Timber Trends and Prospects. A New Appraisal, 1950–1975*, ECE/FAO, 1964.

[116] *European Timber Trends and Prospects, 1950–1980, an Interim Review, Timber Bulletin for Europe*, ECE/FAO, 1969, supplement 7 to volume XXI.

[117] i.e. all uses except for fuel.

Table 5.1

Share of consumption of industrial wood products in Europe and the Soviet Union, by end uses

(Percentage of total)

End-use sector	Europe (excluding Soviet Union) 1949–1951	1959–1961	1970 (estimate)	1980[a] (forecast)	Soviet Union 1955	1975 (forecast)
Construction	29	29	28	27	48.5	41.5
Packaging	15	18	24	28	12.5	27.5
Furniture	6	8	9	10	2.7	4.9
Mining	11	3	3	3	10.1	5.6
Sleepers	3	2	2	1	4.7	2.2
Printing and writing	7	9	13	16	4.2	6.6
Textiles	2	3	2	2	—	—
Other	27	23	19	13	17.3	11.7
Total	100	100	100	100	100	100

Source: For this and the following tables in this chapter, the main source is ECE/FAO: *European Timber Trends and Prospects, 1950–1980; an Interim Review* (1969). In some cases the figures in the source have been up-dated. Percentages based on consumption expressed as wood raw material equivalent (WRME).

[a] Extrapolated from ETTS II forecasts for 1975.

Table 5.2

Consumption and supply of wood in Europe and the Soviet Union

(Million m^3 WRME)

	1949–1951	1959–1961	1970 (preliminary)	1970 forecast	1980 forecast	1970/1949–1951 Annual percentage rates	1980/1970 Annual percentage rates
1. EUROPE (excluding Soviet Union)							
Consumption							
Sawnwood	99	129	158	153	164	2.4	0.7
Wood-based panels	6	16	41	35	50	9.9[a]	3.6
Paper, paperboard and dissolving pulp	35	68	116	118	200	6.2	5.4
Pitprops and miscellaneous roundwood	38	34	23	23	16	. .	. .
Total industrial roundwood	178	246	338	328	430	3.3	2.7
Fuelwood	120	107	73	80	64	. .	. .
Total	298	353	411	408	494	1.6	1.9
Supply							
Removals of industrial roundwood	174	213	275	264	329	2.3	2.2
Removals of fuelwood	120	107	73	80	64	. .	. .
Wood residue utilization	5	13	27	25	35	8.8	3.4
Total	299	333	375	369	428	1.1	1.5
Net imports	1	21	46	40	67	. .	. .
Net imports as percentage of consumption	0	6	11	10	14	. .	. .
2. SOVIET UNION							
Consumption of industrial roundwood	161	249	270	. .	. .	5.3	. .
of which:							
Sawnwood	94	178	185	. .	. .	3.5	. .
Wood-based panels	1.5	3.8	9.1	. .	. .	10.2[a]	. .
Paper and paperboard	4	9	17.5	. .	. .	7.7	. .
Supply							
Removals of industrial roundwood	161	262	300	. .	. .	3.1	. .
Removals of fuelwood[b]	105	108	100	. .	. .	—0.2	. .
Net exports	—	13	30	. .	. .		

[a] 1960–1970. [b] Equals consumption.

Per capita consumption of forest products (excluding fuel wood)

(M³, wood raw material equivalent)

	Northern Europe[a]	*EEC*	*British Isles*	*Central Europe*[b]	*Southern Europe*[c]	*Eastern Europe*	*Total*	*Soviet Union*
1949–1951	1.08	0.41	0.52	0.43	0.14	0.50	0.43	0.90
1959–1961	1.26	0.57	0.68	0.50	0.18	0.59	0.55	1.16
1970	1.56	0.72	0.82	0.62	0.28	0.63	0.66	1.11

[a] Denmark, Finland, Iceland, Norway, Sweden. [b] Austria, Switzerland, Yugoslavia. [c] Greece, Portugal, Spain, Turkey.

This was the result not only of the fast growth of consumption of these products but also of the relatively slow growth in demand for sawnwood and the stagnation in demand for wood used in the round. The volume of industrial wood used annually in Europe increased from 1950 to 1960 by over 60 million m³, twice as much as the increase in consumption between 1913 and 1950. Total consumption of wood in Europe rose by 1960 to 341 million m³—well above the level at which it had stayed over most of the preceding half century.

In 1960 to 1970 annual consumption of industrial wood increased by another 70 million m³. At the same time, there was a marked decline in the use of wood for fuel, which fell from 120 million m³ in 1950 to 107 million m³ in 1960, and to just over 80 million m³ in 1970.

In the Soviet Union, consumption of industrial wood, stimulated by the great need for reconstruction, rose rapidly after 1950, from about 160 million m³ to about 260 million m³ in 1960 and to some 300 million m³ in 1970. The use of wood for fuel, however, did not show any major changes during this period, and seems to have fluctuated at a level slightly above 100 million m³ annually.

Relatively small changes took place in the pattern of consumption by principal end uses (see table 5.1). Construction, in both Europe and the Soviet Union, is still the largest single consuming sector—in the Soviet Union well over 40 per cent of the total. This is partly due to the strong and rapid introduction of wood-based panels in construction, as a more competitive material than traditional sawnwood. The figures also demonstrate the rapidly growing importance, in both Europe and the Soviet Union, of packaging, printing and writing materials, and in general the growing importance of products derived from wood-pulp (including their increasing share in packaging). On the other hand, use of wood in the round or in unprocessed form (mining and other) is declining rather rapidly. The same picture is reflected by changes in the pattern of usage of the main categories of wood products; sawnwood and other less or non-processed industrial wood products continue to lose in importance having fallen to less than 40 per cent of total wood consumption in Europe (see table 5.2).

Generally speaking, the increase of per capita consumption in western Europe is due to rising consumption of wood-pulp products and expansion in the consumption of wood-based panels, while in northern Europe the efforts to increase the use of sawnwood in construction, despite already very high rates prevailing there, is an additional factor. The doubling of per capita consumption in southern Europe is worth noting, and is associated with the rapid growth of GNP in these countries; but the level of consumption is much lower than in any other group. The very slow increase in eastern Europe reflects the efforts to economize in the use of solid wood materials and the lagging importance of wood-pulp products behind western Europe. The still smaller increase in the Soviet Union seems to be due to two main factors: one is the still dominant position of sawnwood and the efforts to use it more economically; the second is the still rather unimportant share of wood-pulp and wood-based panels in total consumption, although their importance is gaining rapidly. The level of total consumption per capita in the Soviet Union is still, as it was in 1950, well above that in any of the groups shown above, except for the other major wood-producing area—northern Europe.

The relation between the increase in GDP and that in wood consumption has varied substantially between the different groups of countries:

	Growth of wood consumption (Per cent per year)		*Ratio: growth of wood consumption (Growth of GDP)*	
	1959–1961 / 1949–1951	*1970 / 1959–1961*	*1959–1961 / 1949–1951*	*1970 / 1959–1961*
Northern Europe	2.2	3.4	0.6	0.8
EEC	4.2	3.7	0.7	0.7
British Isles	3.0	2.9	1.2	1.0
Central Europe	2.5	3.5	0.5	0.7
Southern Europe	4.2	6.8	0.9	1.0
Eastern Europe (excluding Soviet Union)	2.7	1.4	0.3	0.2
Total	3.3	3.3	0.6	0.7

In total, wood consumption in Europe increased by just over 3 per cent a year in the last two decades; if this rate continues in future, consumption would increase by two and a quarter times over 25 years. In eastern Europe, the rate of increase was much less, but in southern Europe much faster, than the European average. The connexion with the growth rates of GDP in the various country groups is a rather loose one; the expansion of general economic activity plays a part in changes in wood consumption, since the ratio of change to that of GDP is mostly between 0.6 and 1.0 (except in eastern Europe where it is much lower). It is clear however that the rate of increase in wood consumption is also partly determined by other factors, such as those summarized above, which are largely independent of general economic growth. Appraisals of prospects suggest some fall in the ratio in future years, and therefore—since GDP growth rates are not expected to change much—in the rate of growth of wood consumption.

Despite the massive growth in the total volume of industrial wood required in Europe, the rate of increase is slower than that of Europe's GNP, so that in aggregate wood is still losing ground in the economy. Moreover, even consumption of wood-pulp products and wood-based panel products, which have both grown faster than GDP, did so by smaller margins in the 1960s than in the 1950s. In relation to the general level of economic activity, the growth in requirements even of these products will probably continue to slow down gradually in the future. Nevertheless, the absolute volume of wood demand is growing by such massive amounts that it is already giving rise to supply problems.

Supply of wood raw material

To what extent can available supplies be expected to meet the growth of future demand and how can the supply be adapted to the changing pattern of raw material requirements and new processing techniques?

Until after the Second World War, Europe was largely self-sufficient in wood, its net imports and net exports being relatively minor. Europe's forests had produced most of the wood required—with the exception of special sizes and species not available in Europe. Although requirements for industrial wood had risen slowly during the first half of the century, total removals of roundwood rose very little because of the more or less concurrent decline in the use of wood for fuel.

The application of more dynamic forest policies and a fuller use of available forest resources, together with the changing pattern of wood raw material requirements as regards both sizes and species caused by developments in wood-processing methods, led to significant changes in the pattern of removals in the post-war period. The share of small-sized industrial roundwood rose from 42 per cent in 1950 to 47 per cent in 1970, and is expected to exceed 50 per cent by 1975. At the same time, broad-leaved species, which in 1950 represented only 18 per cent of all industrial roundwood, had risen by 1970 to over 27 per cent of all industrial roundwood removals.

The principal features of the supply/consumption relationship in different parts of Europe can be summarized as follows:

(*a*) The main consuming regions, the *EEC countries and the British Isles*, accounted in 1950 for 52 per cent of total European consumption. In 1970 they accounted for 56 per cent. At the same time their share of available European supplies declined from 26 per cent in 1950 to 25 per cent in 1970. This had led to a rapid and considerable deterioration of the industrial wood balance of this group of countries;

(*b*) The situation in the *north European* countries shows an opposite development: their share of total European consumption has declined from 11 per cent in 1950 to 10 per cent in 1970, while their share of total European supplies has risen from 36 per cent to 39 per cent. The result has been a rapid development of supplies surplus to domestic needs;

(*c*) The *central European countries*' share in total consumption has not changed appreciably between 1950 and 1970, while supplies, although increasing, have lost in relative importance with apparent surpluses declining;

(*d*) *Southern Europe*, which in the past had a very low level of consumption, is steadily increasing its share of total consumption and, even more, of total supply;

(*e*) In *east European* countries, which in the first half of the century were in aggregate largely self-sufficient, the growth of both consumption and available supplies was below the European average although both are rising in absolute terms. The combination of more severely controlled wood consumption and rather conservative forest management policies appears to be the main reason.

In the *Soviet Union*, the forest industries before the Second World War were based mainly on the resources available in the western part of the country, while those east of the Urals were practically unexploited. With the rapid growth of requirements in the post-war period, and with most of the resources in the western part of the country fully utilized, further forest development was soon oriented towards the vast resources of Siberia. These resources, which account for almost one-fourth of total world resources, in fact represent a formidable reserve of raw material for development. Consequently, a dynamic programme was initiated during the late 1950s and gained momentum towards the end of the 1960s. This development was characterized by the construction of very large processing units, or combinates, representing in most cases an integrated approach to the processing of wood raw materials. But despite the rapid growth of removals in Siberia, they are still very much less than the annual growth of the forests and even less than the natural losses in the mostly mature or over-mature forests of the region. The long distances to the main consuming areas and consequent transport problems still represent a major obstacle to the fuller economic use of the enormous Siberian potential. When improved transport and industrial infra-structure in this region become a reality, the forest industrial activity of the Soviet Union will be concentrated there.

TABLE 5.3

Europe excluding Soviet Union: trade in forest products with other regions of the world by commodity groups

(Million m³ WRME)

	Imports		*Exports*		*Net trade*[a]	
	1949–1951	*1970*	*1949–1951*	*1970*	*1949–1951*	*1970*
Roundwood	2.3	16.4	0.7	0.2	−1.6	−16.2
Sawnwood	5.8	18.6	4.9	3.2	−0.9	−15.4
Pulp	1.5	15.9	4.5	3.1	+3.0	−12.8
Paper and paperboard	0.5	5.6	4.3	6.7	+3.8	+ 1.1
Wood-based panel products	0.1	3.3	0.2	1.0	+0.1	−2.3
Total	10.2	59.8	14.6	14.2	+4.4	−45.6

[a] + = net exports; — = net imports.

In addition to the factors stemming from the uneven geographical distribution of supplies in Europe, there are other limitations imposed by the fact that much of the forests are confined traditionally to poor non-agricultural soils, marginal lands or regions with inclement climates, or to areas that are remote from the centres of consumption. But it is equally clear that, even within these limitations, past and current forest management practices are not always directed towards harvesting the maximum amount of wood that the forest could yield. Management practices in a number of countries have in the past been directed towards achieving a large "reserve" of standing timber in the interests of a sustained annual yield of large-sized logs, and for security. But not only has the growth of demand accelerated; the pattern of demand has altered too. The increasing share used for woodpulp and wood-based panels industries is met by small-sized wood where quantity rather than quality is increasingly important. A premium for size and quality is more and more applied only to special categories of wood, such as veneer logs, and is relatively less significant for most grades of sawlogs and for other industrial wood in general.

Foreign trade

Foreign trade, both within the region and with other regions has, since 1950, become increasingly important in meeting European requirements of industrial wood. Europe's trade with other regions, broadly corresponding with the deficit in domestic supplies, has represented a steadily rising share of Europe's total consumption of industrial wood. (See table 5.3 for trade in the main categories of forest products, and table 5.4 for the development of trade with other regions.) While Europe's dependence on the Soviet Union and North America has shown a marked rise, the development of trade with Africa is also interesting. An export surplus with Africa of 1.8 million m³ in 1950, changed into a net import of 6.2 million m³ by 1969. The balance with the Asia-Pacific region and Latin America has not changed

TABLE 5.4

Europe excluding Soviet Union: trade in forest products with other regions

(Million m³ WRME)

	Soviet Union			*North America*			*Africa*		
	1950	*1960*	*1969*	*1950*	*1960*	*1969*	*1950*	*1960*	*1969*
Imports	2.1	12.1	21.8	5.9	10.7	19.9	1.2	5.0	9.5
Exports	2.4	2.1	2.6	3.1	2.6	3.3	3.0	2.8	3.3
Net trade[a]	+0.3	−10.0	−19.2	−2.8	−8.1	−17.6	+1.8	−2.2	−6.2
	Latin America			*Asia/Pacific*			*Total*		
	1950	*1960*	*1969*	*1950*	*1960*	*1969*	*1950*	*1960*	*1969*
Imports	0.5	0.7	1.1	0.5	1.2	2.9	10.2	29.7	55.4
Exports	3.1	2.5	2.1	3.0	3.7	4.9	14.6	13.7	15.2
Net trade[a]	+2.6	+1.8	+1.0	+2.5	+2.5	+1.8	+ 4.4	−16.0	−40.2

[a] + = net exports; — = net imports.

perceptibly, mainly because of continued significant exports of pulp and paper products to these regions. Imports from Africa, in particular, were marked by a strong increase in the imports of both tropical hardwood logs and sawn tropical hardwood, Africa accounting for the largest part of Europe's imports of these products. Imports of tropical hardwood logs from all sources, in fact, increased from 1.1 million m³ in 1950 to 6.4 million m³ in 1970, and those of sawn tropical hardwood from 0.5 million m³ to 1.6 million m³.

The Soviet Union's importance as a supplier to regions other than Europe has also considerably increased since 1950, Japan importing growing quantities from Siberia. Thus, net exports of the Soviet Union to the world as a whole have risen from 0.3 million m³ in 1950 to as much as 30.3 million m³ in 1970, when over one-third of Soviet exports went elsewhere than to Europe.

In intra-European trade, several important changes have taken place. In the trade in coniferous logs, pulpwood and pitprops, Finland alone accounted in the early 1950s for the major part of Europe's total exports, reaching 76 per cent for pulpwood in 1951, 67 per cent for coniferous logs in 1952 and 52 per cent for pitprops in 1955. Since then Sweden has become by far the largest European supplier of small-sized roundwood, while Finland has been a net importer since the mid-1960s. There was another change in the pattern of trade, particularly in roundwood: while in the earlier years wood was traded over long distances across the European region, the trade now seems to be limited increasingly to border trade. This can be observed in the trade between practically all nations of Europe. It is difficult to know how far these developments are the result of regional economic groupings or simply caused by the need for operational economies at regional and national levels.

In sawnwood and wood-based panels, another significant change has taken place. The formerly rather short shipping seasons, in particular between the north European countries and the rest of the region, have changed into almost year-round shipments, mainly as a result of improved transport and handling methods, roll-on/roll-off transport of products by rail and road, the introduction of ships specially designed to transport forest products and, at the same time, the establishment of special timber terminals at the importing end adapted to the new methods of transport and handling. This greater flexibility over longer shipping periods has also had the effect of reducing current stockholdings at both the producing and the importing and consuming ends, thus relieving the financial burden of large stocks.

Prospects [118]

The trends up to 1970 are expected to continue. It is estimated that at the level of probable requirements in 1980 (associated with a more than doubling of Europe's GNP since 1960), well over half of all the industrial wood consumed in Europe will be used in the form of wood-pulp products and wood-based panels, and consumption of these products will have much more than doubled over 20 years. Requirements of sawnwood, on the other hand, are in aggregate expected to do little more than keep pace with growth in population, while requirements of wood to be used in the round will continue to decline rapidly.

TABLE 5.5

Europe excluding Soviet Union: consumption of industrial forest products

(Million m³ WRME)

Year	*Total*	*Products of sawlogs and veneer logs*	*Other industrial forest products*
1949–1951	178	103	74
1959–1961	247	138	109
1970 (preliminary)	339	172	167
1970 (interim review estimates)	329	166	163
1980 (interim review estimates)	431	182	249
1990 (tentative estimates)	550	190	360
2000 (tentative estimates)	680	190	490

The increase in Europe's total use of wood more and more reflects the rapid growth in the consumption of wood-pulp products and wood-based panels. Between 1960 and 1980 a more than doubling of Europe's GNP is likely to be accompanied by a rise in total requirements of industrial wood of about 75 per cent. If this comes about, Europe's wood consumption will have risen by almost 150 per cent during the thirty-year period 1950–1980, a remarkable contrast to the modest growth over the earlier part of the century.

In spite of the uncertainties attaching to precise forecasts, there is every reason to expect that the general trends in the pattern of requirements, both by end-uses and by principal products, will continue as in the past twenty years. The uncertainties, on normal assumptions, will not affect the basic fact that growth in requirements by 1980 and beyond will be very large indeed in terms of volume, even if not in rate of growth.

The magnitude and momentum of this growth in total wood requirements tend to conceal certain less dynamic developments within the total. Probably the most important is the extent, already emphasized, to which the over-all share of sawnwood is declining. There is an important sawmilling industry in Europe and a very large volume of sawlog-size timber in Europe's forests; in the context of Europe's forest and wood-using economy as a whole, it is clearly a matter of concern to ensure that sawnwood retains and, where possible, improves its position in the European market. Much of the difficulty arises because the structure of the sawmilling industry, which still consists in the main of a large number of small units, puts it at a disadvantage in comparison with its bigger and structurally more modernized and concentrated competitors; also, the nature of the sawmilling process does not lend itself so readily to cost-saving development

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[118] Derived mainly from ECE/FAO: *European Timber Trends and Prospects 1950–1980; an Interim Review* (1969), with some updating of figures.

TABLE 5.6

Europe excluding Soviet Union: domestic supply of wood raw materials

(Million m^3 WRME)

Year	*Total removals*		*Fuelwood removals*		*Industrial roundwood removals*		*Transfer of industrial residues*		*Total domestic supply of industrial wood*	
1949–1951	294		120		174		5		179	
1959–1961	320		107		213		13		226	
1970 (preliminary)	344		73[a]		271		27		298	
1970 (interim review estimates)	344		80		264		25		289	
1980 (interim review estimates)	393		64		329		35		364	
	H	L	H	L	H	L	H	L	H	L
1990 (tentative estimates) . . .	470	440	60	60	410	380	45	40	455	420
2000 (tentative estimates) . . .	550	465	50	50	500	415	50	45	550	460

H = Higher alternative
L = Lower alternative

[a] Fuelwood removals data for 1970 are not comparable with those for 1950 and 1960 or with Interim Review estimate for 1970, due to revisions since the Interim Review was published.

through mechanization and automation. Nevertheless, there remains considerable scope for such improvements, in particular, through co-operation within the sawmilling industry to improve the level of research, product development and marketing, and through standardization of sizes, quality control, and transport and handling. There is also scope for co-operation with the other wood-using industries to co-ordinate felling and logging, to ensure the optimum allocation of roundwood supplies and the better utilization of sawmill residues.

The need to rationalize the over-all pattern and structure of wood use, and of the wood-using industries, is likely to become more urgent in the future, since difficulties in obtaining supplies will heighten the competition for raw materials amongst the different industries—a competition that may radically affect forest management objectives and change the incidence of the various categories of product that can be made available.

Up to 1980, the balance between over-all supply and requirements does not seem likely to present critical problems. The over-all deficit in industrial requirements will grow—from about 40 million m^3 in 1970 (12 per cent of consumption) to about 60 million in 1980 (15.5 per cent of consumption). But this means no more than a continuation of the post-war trend in net imports (see table 5.7).

TABLE 5.7

Difference[a] between Europe's consumption and domestic supply of industrial forest products

	Million m^3 WRME		*Per cent of consumption*	
1949–1951	+ 1		—	
1959–1961	−21		8.5	
1970 (preliminary)	−41		12.1	
1970 (interim review estimates).	−40		12.2	
1980 (interim review estimates).	−67		15.5	
	Higher[b]	Lower[c]	Higher	Lower
1990 (tentative estimates) .	−130	− 95	23.6	17.3
2000 (tentative estimates) .	−220	−130	32.4	19.1

[a] + = surplus; — = shortfall. Not necessarily the same as net exports and net imports respectively, as stock changes are not allowed for.

[b] Derived from *lower* estimate of European removals.

[c] Derived from *higher* estimate of European removals.

Prospects for the longer term

In the longer term, however, a more important increase in the deficit of Europe (again, it must be remembered, excluding the Soviet Union) is in prospect. Rough estimates have been made of the prospective increase in European demand up to the year 2000, based, again, on a continuation of the general economic tendencies of the past. These indicate a total demand for around 680 million m^3 (rather more than 1 m^3 per head of population). To what extent could expansion of domestic supply within Europe meet a requirement of this order?

Tentative projections, based on the ECE/FAO assessments, suggest that the range of possible total domestic supplies of wood in the year 2000 might lie between 550 and 465 million m^3—an increase of between about 200 and 120 million m^3 over the 1970 level (see tables 5.6 and 5.7).

The higher estimate rests on certain assumptions about improvements in the utilization of forest resources. It implies a continued rapid drop in the use of wood for fuel, which appears reasonable, and the greater utilization of fuelwood for industrial purposes, which could be challenged on economic grounds. Secondly, the study of successive forest inventories has revealed a considerable under-estimation of the growing stock and of the annual increment in many countries. Thirdly, it is believed that an intensification of forest management could yield an additional 20 to 40 million m^3 annually. Fourth, more use could be made of industrial residues by greater application of recent technological progress in residue utilization. Finally, policies aimed at curtailing agricultural over-production, particularly in the EEC countries, Finland, and Sweden, are leading to the abandonment of land and its earmarking for afforestation; the quality of soil and the methods that can be used for planning plantation work and exploitation of such land, are generally above the average for forestry.[119]

Europe's forests therefore appear technically and biologically capable, under favourable conditions, of providing an expansion of supply of the order of magnitude suggested by the higher estimate. Even if these assumptions were realized, however, there would remain in the year 2000 a deficit for Europe, still excluding the Soviet Union, of some 130 million m^3 to be met by net imports (as against about 40 million m^3 of net imports in 1970). The lower estimate of supplies is based on a much more cautious assessment of the possibilities of expansion just described. It leads to a deficit in the year 2000 of 220 million m^3.

It remains to consider some of the more qualitative factors which will in fact help to determine the future course of European timber supplies. To begin with, a number of factors could limit the amount of land that can in practice be made available for forestry, the chief one being cost. Most forest operations are labour intensive, and the steady rise in wages bears heavily on the cost of growing and harvesting timber. Moreover, forest labour is becoming more difficult to find. Forest work has traditionally provided out-of-season employment for agricultural workers, but with the exodus from rural areas this labour force is diminishing. Also, forest work is physically hard and uncongenial to many, so that young workers are not attracted to it. To maintain an adequate forest labour force in the future will call for a material improvement in working and living conditions, which will add another factor, apart from wages, to the rising cost of forest operations.

Increasing labour costs can, of course, be partly offset by mechanization, by improving methods of work and by training forest workers. But effective use of machinery requires a concentration of work and the full benefit of mechanization is to be had only in flat land and in even-aged stands under clear-felling systems. Harvesting in mountain forests and selection forests (forests consisting of mixed-age stands), and scattered labour-intensive work such as thinning, will be relatively more costly. There is the possibility, therefore, that even the degree of intensification of management contemplated by present forest policies will be curtailed by rising costs, the generally very scattered nature of Europe's forest holdings being in itself a further obstacle to more rational and concentrated exploitation practices.

While the technical and biological possibility of producing more wood raw material appears to exist, this potential may ultimately be reduced by different economic and environmental factors and developments. Moreover, whether or not European forestry is entirely successful in solving its cost/price problems, the region will remain a relatively high-cost producer of roundwood compared with parts of the world where growing stock is abundant or even in surplus, or where increment rates are higher. To some extent, however, this disadvantage of Europe may continue to be offset by proximity to the main consuming centres.

But even if Europe can produce the bulk of wood raw material required, there are certain categories that cannot be supplied in Europe—notably tropical hardwoods and other non-European species with properties which cannot be matched, either in quality or size, by European woods. Then there are those products, such as quality hardwood plywood and veneer and the mass-produced pulp products, which can be made more economically close to the source of the raw material. Also, the shipping of wood products rather than logs reduces the incidence of freight costs.

The earlier pattern of supplies from extra-European sources developed around a tariff structure which generally encouraged imports of wood as roundwood rather than in processed or semi-processed form—in particular those products which are produced domestically in the main importing countries. A freer flow of such products would require a change in tariff structures to remove this discrimination. How is this likely to affect existing industries in Europe?

That they will be affected cannot be disputed. But the effects should not be exaggerated. In the first place, of the product groups referred to, only a part of each range is concerned. The European industry may be expected to continue to produce utility plywoods while there are domestic supplies of hardwoods of suitable size available. Furthermore, there is already a trend towards the use of more softwoods for the same purpose. Europe can also expect to continue to produce the bulk of its paper and paperboard requirements, since their production is based on a wide range of raw materials some of which, notably waste paper, are to be found near the main centres of consumption. Both the plywood and the paper industry, in fact, have a degree of flexibility which can help them overcome most of the difficulties. Secondly, even if a free flow of trade in forest products were assured, this would not mean that the cost of production would always be decisive. There will always be incentives favouring local production, one of which is the flexibility offered in response to relatively rapid changes in consumer demand and taste.

Considerations such as these suggest that while existing forest industries in Europe will certainly not remain unaffected, the changes may be less drastic for the survival of these industries than is often supposed. But the pattern of new or changing forest industries which will be established in Europe in the course of the next decades is likely to differ considerably from that existing in the 1960s. To put it another way, the basic problem will not be the replacement of European production by imports but rather how, to what extent and in what form imports from other regions will supplement European production.

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[119] The land thus potentially available for afforestation can be estimated at some 7 to 8 million hectares (5 million in the EEC countries alone).

Progress in technology yielding improved production techniques, the development of new types of products and their use will affect all sectors of the forest economy, whether it is the pattern of raw material requirements, the pattern, type and size of the processing industry itself, or marketing and distribution down to the final end-use. Furthermore, through the rapid and growing exchange of technology between European countries, patterns of raw material procurement, processing and utilization tend to become more and more uniform; this will make it easier for the European forest and forest products economy to adapt itself to new requirements.

Industrial development and the progress of technology have already fundamentally changed the pattern of requirements for wood raw material in quality and in size, as well as in composition of species, with a consequent impact on forest management practices. Technological progress is rapid; changes in the pattern and composition of wood raw material resources which are characterized by a particularly long-term planning and operation period cannot always keep pace. However, a very large part of Europe's forest industrial units today are products of the post-war period and are less than 30 years old. Since the average technical and economic lifetime of such a unit, linked with evolving social problems and obligations, is about 30 years, and the lifetime of many of the individual machines used by these industries is only about 5 years, the realistic planning horizon for the forest industrial and economic sector is not necessarily so long as is sometimes suggested. Considerable reconversion and modernization of forest industries has already taken place, together with the introduction of completely new industries. In view of the average age of Europe's forest industrial establishments, considerable and perhaps fundamental changes both in the pattern of industry and in technological processing methods can therefore be expected before the end of the century. In addition to technological changes in the industry itself, developments outside forestry and forest industries may directly or indirectly influence further developments. Other materials which compete with forest products can lead to the introduction of new technologies if both are combined. Furthermore, environmental policies are only beginning seriously to affect some of the major forest industries. The avoidance of pollution already necessitates considerable investments in some of the more important industries, particularly in the pulp and paper sector, and hence increases costs.

The rapid increase in the importance attached to environmental problems in Europe may have far reaching repercussions on the management of existing forest resources, to the extent that environmental requirements may impose certain limitations on forestry's traditional role of supplying wood. These repercussions may be of different types: they may lead to certain forest areas being declared protection, conservation or recreation areas with severe restrictions on their commercial exploitation, or they may constitute hindrances to normal management and exploitation because of landscaping and similar constraints and thus affect the economics of production. One future problem will therefore be how to reconcile the imperatives of normal economics in forest management with environmental requirements. It will also be necessary, to ensure sound management with a pronounced "environmental" character, to determine as soon as possible the quantitative values which the forests represent to society. These problems can be expected to increase greatly in both importance and complexity. Europe is densely populated and living standards are relatively high. Demand for recreational facilities is expanding strongly and forests provide an attractive choice of leisure pursuits, particularly for the ever-growing number of city dwellers. Furthermore, the importance of forests in their protective role is certainly not going to decline. While the productive role of forests, the growing and harvesting of timber, is not entirely incompatible with their role as provider of indirect benefits, the latter's relative importance will undoubtedly grow and could reduce to some extent Europe's wood production potential.

These are some of the uncertainties which surround any attempt to assess the long-term prospects. It is not, however, too soon for European foresters and forest industrialists to concentrate on methods of adapting the forest economies of Europe to those changes in demand and supply trends of which the direction, if not the exact magnitude, can be regarded as reasonably certain.

CHAPTER 6

ENERGY DEMAND AND RESOURCES

Increasing output, changes in industrial structures, the rising importance of international trade, economic integration and co-operation between countries have all had a decisive effect on energy demand and supply in Europe. During both the 1950s and 1960s total consumption of energy [120] in Europe (as in the world as a whole) rose by about 5 per cent a year. The rates of expansion both in western and eastern Europe were slightly less than the estimated rates of expansion in over-all economic activity:

Growth of primary energy consumption and of GDP, 1950–1969

(Percentage a year compound)

Region	Energy consumption	GDP	Ratio: growth of energy consumption / Growth of GDP
Western Europe	4.1	4.6	0.9
Eastern Europe excluding Soviet Union	5.2	5.9	0.9
Soviet Union	6.2	7.5	0.8
Total Europe	5.0	5.5	0.9
United States of America	3.6	3.7	1.0
Rest of the world	7.1	. .	. .
World	4.8	. .	. .

Source: United Nations, *World Energy Supplies (Statistical Papers, Series J).*

Apart from some friction losses, the growing and increasingly diversified energy requirements of the 1950s and 1960s were covered in a way which allowed further economic expansion. This reciprocal dependency of energy supply and economic growth, and the satisfactory flexibility of the European energy economy, could be looked upon as salient features of post-war economic development.

The relations between growth in primary energy use and growth of general economic activity are complex. The change in the industrial pattern—and particularly the changing relative importance of the most energy-intensive industries, notably metal-making and chemicals—is one factor. Thus in eastern Europe, industry, in particular the iron and steel industry, plays a greater role as an energy consuming sector than in western Europe; in the west, transport takes a greater proportion. Electricity covered about one-fourth of consumption in 1969 in both parts of Europe and similarities of technology led to similar proportions of electricity consumption in industry in general and in the iron and steel industry in particular. Significant differences in the use of electricity in transport were due to the much greater importance of automobile transport in western Europe. The differences of electricity use in the household sector were due to different standards and conditions of living.

Breakdown of final consumption (in coal equivalents) of all forms of energy in 1969

Consuming sector[a]	*Western Europe*[b] Total	*Western Europe*[b] of which: percentage share of electricity[d]	*Eastern Europe*[c] Total	*Eastern Europe*[c] of which: percentage share of electricity[d]
Industry and construction	46	28	57	28
of which:				
Iron and steel industry	13	20	16	18
Transport	16	4	9	13
Households and other sectors	39	27	34	16
Total	100	25	100	23

Sources: Energy statistics, EEC, Brussels, 1971, No. 1–2, pp. 5 and 125; *Annual Bulletin of General Energy Statistics for Europe*, 1969, ECE, 1971.

[a] Excluding energy-producing industries and losses in transport and distribution.

[b] Belgium, Federal Republic of Germany, France, Italy, Luxembourg, Netherlands and the United Kingdom.

[c] Czechoslovakia, Hungary, Poland and Romania.

[d] Converted at 1,000 kWh = 0.385 ton coal equivalent for western Europe and 0.430 ton of coal equivalent for eastern Europe.

Another factor making for increased use of primary fuel is the displacement of direct fuel use by electricity in industry, transport and households. This trend has resulted in an apparent loss of efficiency because of conversion losses in electricity generation.

Against this can be set the considerable gains in fuel efficiency resulting from technological change. Among the most striking are the economies in primary fuel use in modern methods of iron and steel manufacturing and of electricity generation itself.[121]

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[120] Total energy demand is measured here in terms of tons of coal equivalent (t.c.e.); for conversion factors see United Nations, *Statistical Papers, Series J.*

[121] Input of coal and oil in thermal power stations:

Kg coal equivalent/kWh

Region	*1955*	*1961*	*1967*
Western Europe	0.494	0.424	0.386
Eastern Europe	0.695	0.537	0.450
Europe	0.543	0.453	0.404
Soviet Union	0.460	0.388	. .
United States	0.411	0.376	0.373

Source: Outlets for Solid Fuels in the Thermal Power Sector, 1970 (ST/ECE/COAL/57).

TABLE 6.1

Consumption and production of primary sources of energy

Region	Year	Total energy consumption (million t.c.e.)	*of which:*							
			Solid fuels		*Liquid fuels*		*Natural gas*		*Hydro and nuclear electricity*	
			Share of consumption (per cent)	*Production of hard and brown coal (million tons)*	*Share of consumption (per cent)*	*Production of crude (million tons)*	*Share of consumption[a] (per cent)*	*Production (000 Tcal)*	*Share of consumption[b]*	*Production (kWh)*
Western Europe	1950	562	88	481	12	4	—	14[c]	–	127[c]
	1958	771	71	536	25	13	1	72	3	194
	1969	1 246	37	394	53	20	6	534	4	363
Eastern Europe (excluding Soviet Union)	1950	154	93	170	5	6	—	26[c]	–	2[c]
	1958	269	90	250	6	13	5	86	–	5
	1969	430	76	337	14	38	10	287	–	9
Soviet Union	1950	304	73	223	23	38	4	49[c]	–	14[c]
	1958	598	70	424	23	113	6	262	–	46
	1969	1 011	43	456	32	328	24	1 689	1	118
Total Europe	1950	1 020	84	874	14	48	2	89[c]	–	143[c]
	1958	1 639	73	1 210	21	139	4	420	2	245
	1969	2 687	45	1 187	39	386	14	2 510	2	490
United States	1950	1 093	41	502	35	284	22	1 969[c]	1	104[c]
	1958	1 335	26	390	41	347	31	2 908	1	144
	1969	2 189	21	515	41	479	37	5 465	2	268
World	1950	2 499	63	1 601	25	537	9	2 131[c]	2	373[c]
	1958	3 755	54	2 061	31	928	14	3 575	2	608
	1969	6 416	37	2 330	41	2 109	20	9 148	2	1 182

Source: United Nations: *World Energy Supplies, Statistical Papers, Series J*, various issues.

[a] Converted at 1 m^3 = 1.332 t.c.e. [b] Converted at 1,000 kWh = 0.125 t.c.e. [c] 1951.

The impact of these factors on energy demand in the various countries differs because of different economic structures, climate and levels of economic development. Between 1950 and 1969 the discrepancy between the market economies and the centrally-planned economies became even wider while within each region the disparities remained practically unchanged.

Primary energy consumption, per capita

(Kg coal equivalent)

	1950	*1958*	*1969*
Western Europe	1 854	2 387	3 437
Eastern Europe excluding Soviet Union	1 826	2 490	3 592
Soviet Union	1 688	2 888	4 187
Total Europe	1 783	2 622	3 797
United States	6 039	7 628	10 768

The relation between growth rates of energy use and of general economic activity fluctuates from year to year. Business cycles play the major role influencing not only demand but also the efficiency of fuel use; in boom periods less efficient blast furnaces, coke ovens and power stations are used to full capacity. In addition, temperatures influence particularly household demand, and hydraulicity conditions the use of hydro and thermal power plants. Consequently, it is difficult to detect changes in the underlying trends of the ratio of primary fuel usage to GDP. There are, however, reasons for believing that these ratios have recently been tending to increase: for example, saving of fuel in electricity generation [122] and of coke in pig iron production are decreasing and may no longer be big enough to outweigh conversion losses due to increased use of electricity.

The changing pattern of energy resources

Between the 1950s and the 1960s, the pattern of energy supply developed in very different ways. Until 1958, the main burden of energy demand in Europe was carried by coal: coal covered 89 per cent of total demand in 1950 and the proportion was still 75 per cent in 1958 (see table 6.1). Thus total European coal consumption increased from 1950 to 1958 by 2.7 per cent a year of which two-thirds derived from increased European production and the rest from increased imports. The high proportions of coal used in Europe, higher than elsewhere in the world, are due largely to the very high proportion in eastern Europe (excluding the Soviet Union) where coal met 90 per cent of demand in 1958. Even in western Europe, coal production increased, if only by about 1 per cent a year, and by 1958 still met over 70 per cent of demand. In the Soviet Union, where total energy consumption doubled, oil held nearly a quarter of the market throughout the 1950s, and the foundations were laid for the subsequent great expansion of natural gas supplies. The picture for the United States is in marked contrast: coal production was reduced by more than 20 per cent, its share of the market falling to only one quarter by 1958; in that year, oil was meeting over 40 per cent of the demand and natural gas over 30 per cent.

The trend in the 1960s was very different—one important factor being the marked reduction in maritime freights which occurred about 1958. Although total energy demand increased as fast as in the 1950s, coal met none of the new demand; by 1969, coal's share of the European market as a whole had fallen to less than a half. This change in trend was much more marked in western than in eastern Europe. Western Europe by 1969 was dependent on non-European sources, predominently oil from the Middle East and Africa, for over half its energy supplies. Production of natural gas, oil, hydro-power and nuclear power accounts for only about 10 per cent, leaving not much more than a third of the market for coal. Hard coal was largely replaced by fuel oil for heating and by naphtha for chemical processes, while the railway systems turned increasingly away from steam.[123] The reasons are familiar enough: on the demand side, technical factors and cost of handling led to a preference for liquid fuels while the price of oil fell relatively to coal; the shortage of manpower, the exhaustion of easily-worked coal seams, and the difficulties of securing adequate increases in productivity, had already by the early 1960s reduced the competitive power of the coal industry. Coal's decline created social and regional problems in many countries which led governments to support the industry by, for example, import controls on coal and oil, taxes on oil, subsidies to mining regions and restrictions on the use of oil in power generation. The process of adaptation lasted throughout the 1960s and will certainly continue for some years.

In eastern Europe and the Soviet Union, similar shifts occurred during the 1960s in the pattern of energy supply. The share of coal in the Soviet Union fell from 70 per cent of energy demand to 43 per cent (little more than in western Europe) and from 90 per cent to 76 per cent in the rest of eastern Europe. But these shifts were somewhat less marked than in western Europe so that coal production, and employment in coal mining, continued to increase quite strongly in eastern Europe as a whole. The pressure of demand for energy, combined with difficulties in raising the level of hard coal production, led to increased emphasis on brown coal. But oil and natural gas met half the increase in energy needs of eastern Europe as a whole in the 1960s; one-third of the increase was met from the rapid growth of natural gas production in the Soviet Union, which by 1969 accounted for one-sixth of the total energy needs of eastern Europe.

Experience in the United States in the 1960s was in marked contrast to that in Europe. There was little further change in the pattern of usage, only 5 per cent of the United States energy market shifting from solid fuels to natural gas between 1958 and 1969. Since the early 1960s, the image of coal has greatly improved. Mechaniza-

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[122] *Ibid.*

[123] For example, the total number of steam locomotives in 18 European countries (excluding the Soviet Union) fell from nearly 57,000 in 1955 to under 10,000 in 1965, while the number of electric and diesel locomotives increased from 8,000 to nearly 29,000 (ECE, *Bulletins of Transport Statistics*).

Table 6.2

International trade in energy

(Million tons)

Imports to:	*Imports from:*	*Coal and coke*					*Crude petroleum*			
		Western Europe	*Eastern Europe*	*Soviet Union*	*United States*	*World*	*Middle East*	*Africa*	*Soviet Union*	*World*
Western Europe	1958–1960	40.0	12.0	4.2	21.1	77.8	121.1	4.3	4.8	147.7
	1967–1969	38.0	15.6	7.9	15.1	76.9	252.3	164.0	24.0	468.2
Eastern Europe	1958–1960	0.8	15.3	8.7	—	24.8	—	—	5.9	5.9
	1967–1969	0.7	19.4	14.7	0.2	35.0	0.6	1.5	27.6	29.9
Soviet Union	1958–1960	—	4.9	—	—	4.9	—	—	—	1.1
	1967–1969	—	7.9	—	—	7.9	..	..	—	..
World	1958–1960	42.0	32.2*	13.4	39.6	129.4	193.4	4.3	13.1	345.8
	1967–1969	39.2	42.9*	25.7	48.7	169.6	487.0	185.7	59.3	923.3

Source: United Nations: *Statistical Papers, Series J,* Nos. 6 and 14.

tion and increased productivity, while many pits have been closed, resulted in a fall in delivered prices (at least in 1961 to 1967); this was also reflected in increased exports of coal. Meanwhile the contribution of nuclear power failed to match expectations and the reserves of oil and natural gas were evidently declining in relation to rising consumption.

International trade in energy

Until the 1950s, by far the greater part of energy requirements in the world was covered by production in the consuming country. International trade in fuel was equal to only about one-eighth of world consumption in 1900, 1925, 1937 and 1950. In the 1950s, and still more strongly in the 1960s, the increasing use of oil transformed much of the world's energy economy into an international market: the share of international trade in world consumption rose to 16 per cent in 1958 and 26 per cent by 1969 (when 90 per cent, in coal equivalent, of world fuel trade was in oil).

Europe was a net exporter of energy (in the form of coal) until the late 1920s. Even in 1937, net imports (mainly oil) covered only 4 per cent of Europe's energy consumption. By the end of the 1950s, the changing fuel patterns described above turned Europe into a large importer—the proportion of total energy consumption covered by net imports (98 per cent oil, on a calorific value basis) rising to 21 per cent in 1958–1960 and 43 per cent in 1967–1969.

This change concerned almost entirely western Europe, which relied on net imports for over half its consumption by the end of the 1960s. In eastern Europe, excluding the Soviet Union, net imports were by the end of the 1960s only 8 per cent of consumption, the main source for both oil and coal being the Soviet Union. Trade in fuel between eastern and western Europe, although increasing somewhat during the 1960s, remained very small (see table 6.2)—by 1967–1969 representing only 3.6 per cent of total energy consumption in Europe (excluding the Soviet Union).

Thus the late 1960s saw in effect the development of two different and barely interconnected energy circuits in Europe: the west European circuit based heavily on oil and constituting a major part of the world energy market; and the east European circuit still mainly dependent—apart from the Soviet Union—on coal, and linked closely with the Soviet Union's great potential of oil and natural gas.

Prospects for energy use and resources

It seems useful, in considering future prospects, to draw a dividing line at approximately the early 1980s. It may be acceptable to base a projection until then on an extrapolation of trends and tendencies already present. Thereafter, new factors may begin to dominate the energy balance, in particular the expected viability in the early 1980s of breeder reactors.

It has been shown above that in the long term total primary energy consumption has increased slightly less than the growth of gross domestic product, in each of the broad areas of Europe. It has been suggested, too, although there can be no certainty, that there has been a more recent tendency for energy requirements per unit of total product to rise—possibly as a result of the narrowing margins for fuel economy. This tendency may well be strengthened by a shift in the Soviet Union and eastern Europe towards a pattern of energy use more closely resembling that in western Europe (for example, by the extension of motorization). This might offset the potential economies in specific areas of energy usage for which, as the current five-year plans emphasize, there are still ample opportunities in many fields. Thus, it is possible that over the next ten years total primary energy consumption in each main area of Europe will increase at least as fast as GDP.

TABLE 6.3

Estimated apparent consumption of primary sources of energy in the mid-1970s

Region/country	*Year*	*Total primary energy consumption (million t.c.e.)*	*Market shares of*			
			Solid fuels	*Liquid fuels*	*Natural gas*	*Hydro and nuclear electricity*
Western Europe	1969	1 245	37	53	6	4
	ca. 1975	1 640	23	61	11	5
Eastern Europe	1969	430	76	14	10	–
	ca. 1975	590	58	21	21	–
Europe (excluding Soviet Union)	1969	1 676	47	43	7	3
	ca. 1975	2 230	32	51	14	4
Soviet Union[a]	1969	1 011	43	32	24	1
	ca. 1975	1 434	33	35	30	2
Europe (including Soviet Union)	1969	2 687	45	39	14	2
	ca. 1975	3 664	32	45	20	3
United States[b]	1969	2 189	21	41	37	2
	ca. 1975	2 940	21	40	36	3
ECE region	1969	4 876	34	40	24	2
	ca. 1975	6 604	27	44	25	3

NOTE. — Conversion factors and 1969 figures according to United Nations: *Statistical Papers, Series J*, No. 14.

[a] *Voprossi ekonomiki*, No. 6/71, p. 51.

[b] Bureau of Labour Statistics Forecast, quoted in *Petroleum Press Service*, No. 7/71, p. 259.

Against this, the expected rate of GDP growth in Europe as a whole in the 1970s may be somewhat slower than it was over the last two decades.[124] The major reason is that the growth rate in the Soviet Union was much faster throughout most of the 1950s than in the 1960s: projections for the 1970s, taking into account the 1971–1975 Economic Development Plan, suggest an over-all growth rate for the 1970s not very different from that of the 1960s. For the rest of eastern Europe, it is expected that over-all growth rates will be on balance rather close to those of the whole period 1950–1969 although there may well be differences in individual countries. For western Europe, too, there is no reason to expect an average growth rate very different from that in 1950–1969. Thus in broad terms it seems likely that the future rate of increase in total European energy demand will be rather similar to that in the past 20 years—about 5 per cent a year, which implies a doubling of total demand over 14 years. However, it is more interesting to consider, within this broad framework, the possible changes in the different sources of energy.

One illustration of the possible pattern of primary energy sources, going up to 1975, is shown in table 6.3. This table is built up from official estimates for the United States and the Soviet Union; for the rest of Europe, the division between primary fuels is based on (i) official forecasts or plans for coal production, (ii) a supply of natural gas at the technical maximum, (iii) a certain increase in the use of nuclear power, while (iv) the rest of the total energy demand is assumed to be met by liquid fuels. The assumptions can all be questioned: more coal than foreseen may be needed in western Europe, less in eastern Europe; long-distance transport facilities may restrict the maximum use of natural gas; the growth of nuclear power may be held back by economic considerations; environmental constraints may affect competition between nuclear and thermal power; price competitiveness between the primary fuels may alter considerably.

On the assumptions underlying the table, which represents only minor modifications to recent trends, oil will account for nearly half the total energy supply by the mid-1970s in Europe as a whole but still only a fifth of the total in eastern Europe apart from the Soviet Union. Coal would fall from nearly a half to about one-third of total energy supply in the European total, which represents approximate stability in the total amount used; but there would be a continuing fall in western Europe in the tonnage of coal used, against a continued but modest increase in eastern Europe and the Soviet Union. Natural gas would realize the highest rates of growth and double its market share. The full exploitation of gas fields in the Netherlands and the North Sea, and the importation of natural gas from the Soviet Union, will make natural gas the most interesting feature of the European energy market of the 1970s. The contribution of nuclear power would still be negligible. Thus oil and, increasingly, natural gas would cover the entirety of new energy demand until—hopefully in the mid-1980s—nuclear power can make a massive and economic contribution to the meeting of energy requirements.

Growth rates of electricity demand are expected to vary between 7 and 8 per cent a year implying an increase in the proportion of primary energy converted into

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[124] See chapter 10, pp. 125-126.

Primary resources in electric power production in Europe, excluding Soviet Union

Resources	Index (1970 = 100)			Share			
	1975	1980	1985	1970	1975	1980	1985
Coal	125	150	185	52	45	37	31
Fuel oil	180	270	390	15	18	19	19
Natural gas	170	280	410	6	7	8	8
Hydro-power	130	140	160	25	22	17	13
Nuclear power	370	1 260	2 800	3	8	19	29

Source: ECE, *Long-term prospects of the electric power industry in Europe* (EP/Working Paper No. 392), tables 14 and 15.

electricity from 24 per cent in 1969 to 34 per cent in 1985.[125] Installed capacity would accordingly increase from 490 GW to 1,400–1,500 GW. It is evident that the tripling of power generating capacities will be expensive in financial and environmental terms: capital expenditure on new plants will be of the order of $200,000 million at present prices.

Moreover, the material base for electricity generation seems likely to change radically. In particular, nuclear power, which in 1970 covered only 3 per cent of electricity production, may well cover something like 30 per cent by 1985 assuming that economically recoverable reserves of uranium suffice to cover demand by thermal reactors. Later, some strain on reserves or prices is expected. But by that time it is hoped that breeder reactors, with perhaps 100 times greater efficiency of fuel use, will have been sufficiently developed. The contribution of coal to power generation, while declining in relative importance, may increase in absolute terms between 1970 and 1980 by about 85 per cent.[126] The contribution of natural gas will grow considerably in absolute terms, not least because it is a relatively "clean" raw material. But its share is expected to increase only slightly; except in countries where indigenous natural gas is available in large quantities,[127] natural gas is assumed to remain more expensive than oil or nuclear electricity. Hydro-power reservoirs available for exploitation are becoming increasingly uneconomic either because of the high costs of construction or because they are remote from consuming centres; moreover there is an ever growing demand for water for other purposes. This source of energy will therefore be the slowest to expand and lose in relative importance (see table above).

Opportunities for east-west trade in Energy

Exports of coal and oil from eastern Europe and the Soviet Union to western Europe increased between 1958–1960 and 1967–1969 from 22.4 million t.c.e. to 54.7 million, or by 10.5 per cent a year. This period was marked by an increasing share of oil (28 per cent at the beginning, 70 per cent at the end) and of shipments from the Soviet Union (46 per cent rising to 88 per cent). Little if any increase is expected in deliveries of coal and oil during the 1970s: opportunities for increased exports of coking coal to western Europe may be outweighed by reduced deliveries of crude oil. But from 1973, more important quantities of natural gas from the Soviet Union may be exported to western Europe and by 1975–1979 some 20 million t.c.e.[128] would increase total east-west fuel trade to about 75 million t.c.e. This is a slower rate of increase than during the 1960s (4 per cent compared with 10.5 per cent) and the share of total exports from eastern Europe in western European energy consumption would fall slightly.

This slowing down may be only temporary. The resources of natural gas in the Soviet Union are enormous (at the end of 1969 proven reserves were about 23,000 million t.c.e., but this quantity is currently increasing). West European reserves of natural gas (5,000 million t.c.e.) [129] are expected to increase in the early 1970s in spite of rising consumption, but from the mid-1970s the growth of consumption is expected to exceed the growth of new discoveries. Greater reliance on Soviet Union, Middle East or North African resources of natural gas would then seem necessary, indeed inevitable, to avoid additional risks or costs to the European energy economy.

Another important opportunity for international trade —making use of the time differences—may arise through the interconnection of the electricity grids in Europe, including in particular the grid in the European part of the Soviet Union. A substantial saving could be effected in the capital cost of new electricity generation by such interconnections.[130]

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[125] ECE, *Long-term prospects of the electric power industry in Europe*, 1971, EP/Working Paper No. 392) table 7, and ECE, *Symposium on the future role of coal in the national and world economies*, 1970 (ST/ECE/COAL/47) p. 93.

[126] ECE, *Long-term prospects... ibid.*, table 14.

[127] ECE, *The use of natural gas in thermal power stations*, 1971 (ST/ECE/GAS/35), p. 25.

[128] ECE, *Symposium on the problems relevant to natural gas markets in Europe*, Barcelona, October 1970 (ST/ECE/GAS/33) p. 77; ECE, *The gas situation in Europe in 1970 and its prospects*, 1971 (GAS/Working Paper No. 256/Add. 1), p. 2.

[129] ECE, *The gas situation... ibid.* (GAS/Working Paper No. 256/ Add. 1) table 1.

[130] ECE, *The interconnection of the electric power transmission systems of countries in eastern and western Europe 1971* (EP/WP. 8/ Working Paper No. 16/Add. 2).

The late 1980s and the 1990s

It is highly improbable that the last fifteen years of this century will be a mere extension of the 1970s. Present patterns (and nuisances) may no longer be acceptable in the living conditions at the end of the century. A continuation of present trends at exponential rates of growth or decline in the various sources of energy supply in any case leads to absurd results. The methodology of exploring the late 1980s and 1990s cannot therefore consist of an extrapolation of past experience: it is impossible to assess —to list a few examples—the effect of the possible introduction of electrocars, continental pipe-lines for coal slurry, direct iron reduction, magneto-hydrodynamic converters, transcontinental transmission of electricity, joint investments of different countries in particular fields (natural gas, oil, coal), gasification of coal, breeder reactors, environmental constraints, unit trains operating on a European scale, hydro-carbon-based nutrition, fluidized-bed combustion, extraction of oil from oil shale, coal and waste, still bigger methane tankers and coal vessels, the shift to other continents of the production of energy-intensive basic materials such as aluminium, pig-iron and steel. Thus the methodology would have to be less numerical, and take the form of expert speculation and the elaboration of chains of occurrences, the perception of crucial situations and the assessment of alternative strategies. It must be said that no co-ordinated effort has yet been undertaken at the inter-governmental level to elucidate the interplay and probabilities of the various elements of the future European energy situation. It is impossible to do more than set out some pertinent questions and tentative speculations.

A first set of questions concerns the growth of energy demand. Present growth rates would lead to more than a quadrupling of European primary energy needs between 1969 and 2000; in the six years from 1994 to 2000 Europe would consume about as much energy as in the seventy years from 1900 to 1969. Is this a reasonable expectation? What would happen if economic growth were no longer to be so prominent an objective of European policies? Or if the energy-intensive, heavy industries were to move away from Europe? Or would environmental constraints, better living conditions and mechanization outweigh any tendency towards a slower growth of energy demand, and by favouring the use of electricity (with its higher conversion losses compared with the direct use of the fuel) increase the primary energy input per unit of GDP?

A second question concerns the supply of primary energy. Present growth rates of supply of crude oil, natural gas and nuclear electricity in its present form cannot continue ad infinitum, because economically recoverable reserves are limited. Among the "new" sources of energy (fusion, tidal power, oil shale, solar energy, the use of household and other wastes)[131] and "new" techniques, only breeder reactors seem to offer a potential big enough to improve fundamentally the supply situation at the end of the century. But what would be the solution if breeder technology does not come up to economic, technical or safety expectations, or does so later than now foreseen (1985–1990)? Would advanced reactor systems such as high temperature reactors, together with the "traditional" fuels (oil, coal, natural gas) fill the gap? Would coal, possibly in gasified or liquid form, enjoy a revival in western Europe like that now experienced in the United States and the Soviet Union? Do other sources of energy available in Europe (brown coal, hydro-power, indigenous oil and oil shale, geothermal energy and peat) offer any significant relief? Or would new sources outside Europe, such as shale oil, constitute the only quantitatively significant and economical alternative to increasingly scarce petroleum, natural gas and uranium?

Estimates of world energy reserves

Energy source, and type of recoverable reserves	*Reserves in 1970*		*Of which, consumed by 2000 in per cent*
	10^9 t.c.e	*Percentage share*	
"Classical" fuels			
Petroleum (proven, probable, possible reserves, ocean beds excepted)	350	4	87
Natural gas (proven and probable reserves)	233	3	73
Hydro-electricity[a] (proven, probable, possible reserves) .	3	—	34
Coal (proven, probable, possible reserves).	7 600	93	2
Total.	8 186	100	8
"New" fuels			
Uranium (proven and probable reserves) at:			
(*a*) extraction costs below $30/kg:[b]			
used in thermal reactors	50		fully consumed in mid-1990s[c]
used in breeders . . .	>3 750		very little
(*b*) extraction costs up to $200/kg:[d]			
used in thermal reactors	1 150		very little
used in breeders . . .	>86 500		very little
Oil shale (proven, probable, possible reserves).	111 000		very little
Tar sands (proven reserves) . .	1		. .

Source: United Nations, *World energy requirements and reserves in the year 2000:* paper presented by Resources and Transport Division, Department of Social and Economic Affairs to the Fourth United Nations International Conference on the Peaceful Uses of Atomic Energy, Geneva 1971 (A/CONF. 49/P. 420). "Possible" reserves are as yet unknown reserves which are expected to be used under technical and economic conditions predicted up to 2000. The final column is based on projected consumption levels.

[a] Converted at 1000 kWh = 0.125 t.c.e.

[b] 2.6 million tons U_3O_8: ECE, *Nuclear energy in electric power production 1972* (ST/ECE/EP/62).

[c] ENEA/IAEO report to the Fourth United Nations International Conference on Peaceful Uses of Atomic Energy, Geneva 1971 (A/CONF. 49/P. 678).

[d] 60 million tons, including uranium extracted from ocean water, excluding Soviet Union and China; see, H. Mandel, *Atomwirtschaft*, May 1970, p. 222.

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[131] The use of household and similar wastes (including paper) for electricity generation is now being developed in a number of urban centres. It is estimated that the calorific value of such wastes in Europe will soon approach about 50 million t.c.e a year (compared for instance with 5 million t.c.e of nuclear power produced in 1969); the calorific value per ton of such waste is of the same order of magnitude as that of lower grades of brown coal.

It is notoriously difficult to calculate the possible reserves of natural resources, and many errors—generally of underestimate—have been made in the past. Nevertheless, the recent estimates set out above, with all their limitations, may contain implications for policy which it seems prudent to treat with some seriousness. The implication is not necessarily that additional reserves cannot be discovered—but, rather, that the picture as now seen gives some pointers to probable trends in relative costs and prices of the primary energy sources.

Some illusions and wishful thinking may hide the problems linked with final energy consumption at the end of the century. Convenience in use and the protection of environment would tend to increase the share of electricity in final energy consumption, possibly up to 45 per cent by the year 2000.[132] The resulting combustion of fuels in power stations would be so large as to represent not just a further quantitative increase but a qualitative change. The scarcity of sites would call for a concentration of power generating capacities and the transcontinental operation of the various European electricity grids. The scarcity of cooling water would require revolutionary innovations or the removal of power stations to off-shore islands.

Out of the total electricity production in industrialized countries in the year 2000, half may be nuclear.[133] And the other half? Since the input of non-nuclear fuels in power stations would be three to four times greater in 2000 than in 1969, it seems that any primary source of energy available in Europe (in particular coal) will be needed; this may open up new channels of trade between the countries which still have substantial reserves, notably the Soviet Union, and the rest of Europe. The question arises whether the enormous investments connected with this growth and the strain on low-cost resources would not end the period of abundant and cheap energy, and would render competitive sources of energy which are not at present regarded as economic.

Less is known about demand other than electricity demand although its share may be expected to lie around 55 per cent of total energy demand in the year 2000. This would be double the amount of total primary energy consumption in 1969. Is it an unreasonable expectation that the chemical properties of the various fuels would outweigh their calorific value, and that the share of the non-energetic uses of primary fuels, especially petroleum (e.g. for plastics, fertilizers, pharmaceuticals) would considerably increase? New secondary and tertiary fuels may be developed, chemically and physically "tailored" to new needs. Has the need for research work in these directions been seen in Europe, or the usefulness of pooling experience and resources at the international level? Indeed the solution of these technological and other problems, taking into account the position of Europe as the most important importer of energy in the world, seems to go beyond national possibilities and to require an intensification of region- and world-wide collaboration.

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[132] (ST/ECE/COAL/47), p. 93.

[133] ECE, *Nuclear energy in electric power production 1972* (ST/ECE/EP/62), chap. I.

Chapter 7

PERSPECTIVES AND POLICIES IN EUROPEAN TRANSPORT

In 1947, Europe was only just beginning to emerge from the railway age. Today, the basic form of transport, both for persons and goods, is motorized road transport, and new technologies characterized by unit loads and multi-modal operation are rapidly developing. Motorization is perhaps the most vivid single change in the daily life of European societies; but the progressive rationalization of the equipment and methods for delivering goods and moving people reflects the early stages of another fundamental aspect of post-war European economies—the trend towards automation and cybernetic control. It is in the context of such a transport system that the physical development of Europe will take place during the next twenty-five years.

In general, three trends can be discerned in the development of European inland transport during the last quarter of a century:

(*a*) A considerable growth of the transport system itself both in absolute terms and in the impact of transport operations on economic and social development;

(*b*) A marked change in the modal pattern of transport brought about by technical progress and changes in users' preferences and leading to an increase in combined transport operations;

(*c*) A gradual merging of self-contained national transport systems into the beginnings of a European system partly as a result of new technologies and partly as a result of the increase in international trade.

It is impossible to quantify precisely the growth of European inland transport within the production structure. The volume of resources devoted to the transport system has risen enormously, but the share of inland transport, for example in gross fixed asset formation, has not varied much either in market economies or in socialist countries; it has remained at about 10–15 per cent. Furthermore, the everyday experience of massive motorization in western Europe is obscured in analyses of production structures by the statistical exclusion of private car operation from production activities and by the recording of much road goods transport in the activities of other sectors. Nevertheless, the growth in the inland movement of goods and people reflects a greater mobility and diversity of activity as a new quality in European societies.

The modal pattern of inland transport has been transformed as a result of the interplay of user demand and technological development. Surprisingly few of the techniques that characterize the European system now have been post-war inventions. They represent, rather, the commercial application of innovations in prototype before the Second World War, or developed first for military purposes during the war, in response to a changing structure of industry and changing consumer demands. The growth in the use of petroleum and natural gas as sources of energy, and of the petro-chemical industry, have promoted the development of pipeline networks which have become a substitute for vehicular movement. The increase of heavy industrial output and of capital construction provided the basis for a revival of inland shipping and the development of bulk carriage by sea. The rapid rise in the use of motor transport was a response not only to personal desires for mobility and convenience but also to a changing pattern of demand for the distribution of goods in more affluent and technologically advanced societies. The rise in the costs of labour and handling relative to the costs of carriage emphasized the need for standardization of equipment, so as to allow labour-saving transfer between different modes of transport and resulting in the development of unit load systems.

At a time of increasing industrial specialization and international trade, there is some danger that the possibilities for mobility, trade and industrial co-operation offered by modern transport technologies will not be fully appreciated and acted upon. The days of autarchic national distribution systems and of self-contained modes of transport are in reality drawing to a close. Europe already has the transport capacity to ensure that the most economical and highest quality resources are made available for its economic and social development, regardless of the geography of production. Technically, it is already possible to deliver goods and move people by means of complex multi-modal systems that ensure optimum conditions of carriage in safety, comfort and price. But the advantages of this new scale of transport operation will not be realized until there is full international collaboration in its development. Furthermore, many of the multi-modal operations will not be able to function economically without a measure of cybernetic control that requires international standardization from the outset.

No one country, or even a subregional grouping of countries, will be able to afford the cost—in terms of low returns on investment and lost opportunities for trade and industrial co-operation—of continuing to develop its own physical distribution system in isolation from the rest of the region. In the nineteenth century, lack of administrative institutions for all-European collaboration left Europe with discontinuities in railway gauges on several national frontiers. These have been tiresome and costly to overcome. But an equivalent lack of foresight in the last quarter of the twentieth century would have more than tiresome and costly consequences. It would create discontinuities in distribution systems, condemning different countries and subregions to commercial eccentricity, to a diminished human environment and to suboptimal use of their assets. Intergovernmental collaboration in inland transport for the whole of Europe is no longer merely a pioneer field of activity as it was 25 years ago. It is in the 1970s a condition of successful economic, social and environmental development.

Motorization

In the last two decades there has been a revolution in the lives of European citizens as a result of the motorization of their transport systems. In western Europe now—and probably in eastern Europe by the end of the decade—few transactions in commodities, from industrial production to retail shopping, and few journeys whether for work or for leisure, can take place without the intervention of motorized transport. Motorization is more than just one among many structural changes. It has transformed the basis of European traffic and it is therefore in the context of a progressively motorized Europe that the other structural changes in the inland transport system must be appreciated.

In nearly all European countries, in 1950, the railways were clearly the dominant form of inland transport to which all other modes were ancillary. It was still appropriate to speak, as authorities spoke in the early 1930s, of "the essential solidarity of industry and of the railway services as a whole and the interdependence of their fortunes".[134] This was not only because the railways carried the bulk of all inland goods tonnages and remained the only possibility for long journeys for the mass of the population. It was also because, in many countries, motor vehicles still had to fight for road space with horse-drawn vehicles. Motorized equipment, like fork lift trucks, was far from universal for cargo-handling, storage and delivery, while there were only about 2 million tractors on the farms of the whole of Europe (including the Soviet Union). Private cars in western Europe were measured in tens per thousand inhabitants. By 1970, despite a differing pace of development in different countries, it was clear that the railways were concentrating on specialized forms of transport for basically motorized societies. The horse had become a negligible factor in European inland transport. Motorized equipment had become essential for cargo handling and the number of tractors on European farms had risen to about 7 million. Private cars in western Europe were measured in hundreds per thousand inhabitants.

The effect of motorization on the carriage of goods in inland transport is very marked both in western and eastern Europe. Four or five-fold increases in road haulage traffic between the early 1950s and the late 1960s are common in both areas. In western Europe, however, the rapid growth of road haulage was accompanied by a much smaller growth in rail goods transport, for which increases of about 50 per cent in the same period were the highest. In certain western countries, the railway system contracted, with the quantum of rail traffic showing no increase at all or even a decrease. In the United Kingdom, the rationalization of the railway system resulted in a loss of about 30 per cent in quantum of traffic between the 1950s and the 1960s. In east European countries, railway traffic increased at about 6–8 per cent a year—half the rate for road haulage.

It seems that the much greater increase of haulage by road than by rail represents a greater capacity of road haulage to take on *new* traffics rather than a transfer of existing traffics from road to rail. In this sense, the difference between western and eastern Europe in the pace of motorization of goods transport can in fact be seen as beginning even in the pre-war period. It is estimated that in western Europe, road transport carried about two-thirds of the increase in inland goods traffic between 1930 and the early 1950s. In eastern Europe during the same period there was a six-fold increase in total inland goods traffic but over 90 per cent of this was carried by rail.

It is, however, in the growth in private motoring that the motorization of European society appears most dramatically. In 1950, the number of cars per thousand inhabitants in western Europe ranged between 7.5 (Italy) and 46.2 (United Kingdom) and in eastern Europe (excluding the Soviet Union) between 0.9 (Romania) and 13.4 (Czechoslovakia). These figures compared with 261 cars per thousand inhabitants in the United States. Barely a generation later, by the late 1960s, the number of cars per thousand inhabitants was over 100 in most west European countries and had reached 250 in France. The annual rate of increase in western Europe shows no sign of diminishing, while in the United States the saturation level of a society in which many families have two cars (about 500 cars per thousand inhabitants) seems near. Compared with these figures, the degree of motorization in eastern Europe in the late 1960s, in terms of cars per thousand inhabitants—ranging between 2 in Bulgaria, 10 in the Soviet Union and 70 in the German Democratic Republic—seems comparatively modest. But the disparity between east and west appears to be the effect of past policies, putting very low priority on the development of private motoring in eastern Europe. These policies are being modified and car ownership in fact doubled and trebled in east European countries and the Soviet Union in the 1960s, with annual rates of increase as high as 20 per cent in the later years. Current plans envisage comparable increases up to 1975.

International integration

The motorization of the transport system was accompanied by a fundamental change in the relationship between inland transport and maritime and air transport. In the immediate post-war period, the links between shipping, aviation and inland transport seemed to be clear cut and manageable on traditional lines. Existing airports were large enough for the first intercontinental services that were being pioneered in aircraft with combustion engine propellers. Labour-intensive handling techniques in sea ports were still viable for multi-purpose cargo ships, while established vehicular transport systems by rail, road and waterway were adequate for the transhipment of crude oil and minerals from ships which were considered big at over 20,000 tons. By 1970, however, not only had there been a transformation of conditions for the traditional sea/air/inland transport links at the port interfaces, but the inland transport system itself had acquired new dimensions in response to developments in maritime transport. First, established terminal infrastructures had become inadequate. Europeans everywhere were anxious about the congestion, environmental deterioration and problems for inland transport links caused by round-the-clock jet flights, especially after the coming into service of jumbo aircraft. Seaport authorities were faced with the need to acquire new storage space and costly mechanical handling systems to remain competitive for bulk carriers exceeding 50,000 tons and for specialized cargo and container ships that required a fast turn-round. Neither for airports nor for seaports could the planning of terminal facilities be any more separated from far reaching plans for inland transport networks with all their associated environmental problems—land-use planning, competition with established settlements and the shifting of market balances for industrial location. Secondly, the increase in the demand for energy and the expansion of petro-chemical industries led to the creation of whole networks of inland transport—the oil and natural gas pipelines—which were technologically and operationally separate from the established vehicular transport systems. This new form of inland transport, in combination with the increasing reliance of Europe on bulk materials delivered from overseas and the development of intercontinental unit load transport for general merchandise, further transformed the traditional balance of advantages for industrial location and with it the geographical pattern of demand for inland vehicular transport. Economically, the future development of road, rail and waterway transport had become tied, as regards both commercial expansion and investment in equipment and infrastructure, to the development of maritime and air transport. The physical planning of inland transport systems for towns and industrial areas no longer took seaports and airports simply as points of departure for road, rail and waterway.

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[134] *Report of the Salter Conference on Road and Rail Traffic*, United Kingdom, 1932.

The determination of European governments in the post-war period to break down the autarchy of their economic—and transport—systems was one of the factors leading to the faster growth rate of international (frontier-crossing) inland transport than that of inland transport as a whole. The preservation of freedom of navigation and, on the railways, international clearing-house arrangements, joint contracting for purchase and subsequent "pooling" of standardized rolling stock, promoted the expansion of frontier-crossing services. By the 1960s, the proportion of international traffic in total tonnage carried was over 50 per cent in many countries' inland shipping and about 25 per cent on many railway systems. Frontier-crossing road haulage also increased, tenfold increases in bilateral international movements not being uncommon between the mid 1950s and mid 1960s. But the share of road transport remained the smallest of all the modes in total frontier-crossing freight movement. For example, in Hungary, Poland and Yugoslavia, despite the large increases in their international traffic generally, the proportion of international traffic in the total tonnage moved by road was less than 1 per cent. Even in the Netherlands, a country which placed great emphasis on frontier-crossing road haulage, the proportion was still less than 10 per cent. While the importance of long hauls in most international traffic favours rail and inland shipping technologies, the main reason for the disparity between the modes probably had little to do with the technology of frontier-crossing transport. For frontier-crossing journeys by private car in western Europe, the swing from rail to road was of the same magnitude as in national transport systems. The main cause of the small share of road transport in frontier-crossing goods transport must therefore be sought in the deliberate domestic policies of governments. In western Europe restrictions were imposed on road haulage, in the interests of freight transport co-ordination, that did not apply to private motoring. In eastern Europe, the general restraint of motorization applied primarily to private motoring.

The structural changes that have taken place in European inland transport in the last 25 years cast some doubt on the continued usefulness of treating "frontier-crossing" transport as a special issue, which in the post-war years has been the basis for much inter-governmental collaboration. Certainly, in terms of harmonization of regimes, the national frontier is an important factor to take into account. But in terms of the development of genuinely European transport operations, its relevance is limited. On the one hand, the rationalization of inland transport technology in conjunction with its increasing links with maritime transport has created a situation in which the equipment used, the infrastructure needed and the commercial operation which is appropriate are the same for international transport as for transport within national boundaries. In terms of the technology of a multi-modal transport system, frontier crossing transport and inter-city transport have been merged into one—world transport. On the other hand, massive motorization has, at least in western Europe, created both economic and environmental problems by a new scale of congestion. Solutions to these problems are being sought in the form of new types of urban transport and distribution systems. But the principles upon which the new urban systems are being based owe as much to environmental as to commercial criteria. The equipment they will use, the infrastructures they will need and the type of management required will differ in many respects from those being actively developed for world transport. Technologically speaking, there is a growing disparity between urban and inter-city (international) transport characteristics which must eventually lead to a new transport interface with all the well-known problems of standardization and integration of separate systems. This feature of the structural changes in inland transport over the post-war years may well be the most significant of all for future intergovernmental collaboration in European transport. It transforms local and urban transport systems, which, in 1947, were technically separate from the rail dominated arterial systems, into an essential element of an inland transport system which is motorized and multi-modal in character.

Rationalization

During the post-war period, there has been a progressive rationalization of the inland transport system by specialization, mechanization and automation leading finally to an increasing measure of cybernetic control of operations. Motorization can be said to have introduced a new dimension into the transport system. The total effect of the other technological changes has been to alter the realities underlying the basic elements—loads, vehicles and infrastructures—in which the transport system was organized and managed until the post-war period.

The extreme case of specialization of inland transport for certain traffics has been the creation of an entirely new inland transport system—the pipeline networks for oil and natural gas—in which the conventional categories of load, vehicle and infrastructure are difficult to distinguish. The extensive development of pipelines in Europe began in the late 1950s, and rested on the assumption that it was cheaper to take crude oil to the main centres of use for refining, and then distribute by vehicular means of transport, than to refine at the ports and distribute the refined products by vehicle over much larger areas. The huge bulk of pipeline traffic has, therefore, been composed of crude as opposed to refined oil, although refined oil pipelines have been developed for certain dense traffics e.g. Le Havre-Paris. From 1963 to 1968, substantial increases occurred in the length of pipelines operated, and even greater increases occurred in the volume of oil carried. The Soviet Union which had already 24,000 km. of pipeline in 1963, had increased this by more than one-half five years later and countries such as France and the United Kingdom, with much smaller networks (1,400 km. and 700 km. respectively in 1963), more than doubled their size. Measured in ton-kilometres, pipeline traffic in France increased more than five times from 1963 to 1968 and in other countries increases of two or three times were not uncommon. The movement of oil by pipeline became a major form of transport during the 1960s and by the end of the decade commanded well over 10 per cent of the market (in terms of ton-km.) in Austria and France, and not much less than 10 per cent in a number of other countries.

In the established modes of transport, the specialization of technology, equipment and commercial operations to cater for the needs of particular traffics has been universal. The growth of trade in petro-chemicals and radioactive substances in particular has required vehicles and equipment conforming to complex safety standards. The most important example of post-war specialization has been the revival of inland shipping in response to the increased demand for transport of goods in bulk. In 1950, a conference, still haunted by the pre-war fear of the extinction of inland shipping through railway competition, met to consider the "permanent latent crisis" of Rhine shipping. By 1970, however, the 260 million tons carried over the 840 km. of the Rhine were equivalent to a quarter of the total tonnage of the railways of the European Communities on more than 90,000 km. of track, while the 50 million tons carried on the Danube represented a doubling of traffic within ten years. This increased share of the European transport market was in large part the result of new technologies permitting specialization on bulk cargoes—such as round the clock navigation by radar which reduced the cost of regular deliveries of coal and minerals, and the introduction of "pusher" techniques that trebled or quadrupled the tonnages that could be carried after a single loading or transhipment operation. The competitivity of post-war specialized inland shipping was confirmed in the 1960s by the accelerated work on the regularization of the passage of the Iron Gates and by the decision to link the Rhine, Main and Danube waterways within the next 10 to 15 years.

The most rapid progress in specialization was made in maritime shipping and road haulage—the forms of transport primarily concerned with inter-continental hauls and terminal collection and delivery. The creation of new transport facilities for users, by linking the specialized services of different modes of transport, was the logical next step. This took the form not only of enhancing traditional co-operation—such as trans-oceanic transport in specialized ships with port-to-destination transport in special railway waggons and/or lorries—but also of new combined transport techniques by which one type of vehicle was carried by another, for example, the "piggy-back" carriage of lorries on specially constructed railway waggons. The most successful of these were undoubtedly certain tourist services—the motorail and air car-ferries—and the roll on/roll off sea journeys for road haulage. The success of this latter technique can be illustrated by the growth of road haulage between the United Kingdom and the Continent from about 3,500 vehicles to over 35,000 vehicles in 1957–1963.

The balance of costs in transport has become increasingly weighted towards terminal as opposed to carriage costs. Thus the success of specialized and combined transport came more and more to depend upon the development of standardized handling and trans-shipment operations. In general terms, the trend towards this sort of standardization necessitated advances in the technology of "unit loads" i.e. the organization of cargoes for mechanical transfer between different modes of transport. The most striking development in this field in the post-war period has undoubtedly been that of the intermodal container for general merchandise. While standardized containers had been in use for many years on the European railways, it was the development of intercontinental containers by maritime transport, later in specially built cellular ships, that began the current process of transformation; this is expected to lead to the containerization of more than 50 per cent of total long hauls of general merchandise in Europe. More recently, the technology of containerization took a further step with the introduction of trans-oceanic barge-carrying ships (for example, Lighter-aboard-ship or Seebee operations) which can be unloaded outside established port installations for subsequent transport by inland waterway pushers.

The development of unit loads and of standardized handling operations has also been the first step towards a further rationalization of transport through automation and cybernetic control. This is inevitably slow and so far practical success has been achieved mainly in the computerization of passenger bookings, in the organization of warehousing and transhipment and in certain railway marshalling operations. Current problems and developments can, however, be readily appreciated in the active consideration being given to the computerization of international trade procedures. In the late 1960s, it became apparent that technological development of the physical movement of goods had not been matched by a similar development in the procedures of commercial and customs clearance of cargoes. Seaports and airports were becoming bottle-necks, where goods—moved physically in quantities and journey times inconceivable in the early post-war period—had to wait long periods (involving locked-up capital) for the documentary clearance procedures to catch up with them. The general impression in trading and transport circles in the 1970s is that the investment in a rationalized transport system is beginning to suffer from inadequate exploitation because shippers are obliged to take account of probable procedural delays when programming their physical shipments. The only solution seems to be the substitution of automatic data processing for traditional documentation in trade procedures.

Impact of transport on economic development

The structural changes in inland transport during the last two decades have probably had their profoundest effect on the regional and urban aspects of economic and social planning. There are of course many reasons for the change in the attitude of governments towards spatial planning—the decline of agriculture and of employment in the basic industries, concern with the environment and the realization that urban expansion needs to be planned on a regional scale. It is however doubtful whether the new attitudes and policies for physical planning (see chapter 9) would have emerged as they did if the economic and social pressures underlying them had not arisen in the context of a changing technology of transport. It was the structural development of the transport system that altered the concept of geographical eccentricity and transformed the power of communications as a catalyst of economic and social development.

Marked economic disparities between regions within the same national state were recognized as a common problem in both western and eastern Europe as a result of the unprecedented economic expansion of post-war Europe. The reduction of these disparities and the development of the less favoured regions had become a cornerstone of the policies of nearly all European governments by the late 1950s. This objective was included, for example, in the Preamble to the Treaty of Rome. In political terms, the objectives of regional development have varied little during the post-war period but, in technological terms, the scale and nature of the regional development programmes have undergone profound changes as a result of the evolution of the transport system.

Two of the most spectacular governmental regional policies of the post-war period were the development programmes for the Italian Mezzogiorno and for Slovakia. In both countries there has been a radical change in attitudes towards the potentiality of transport, and the similarity of the trends in the two regions indicates that they are not features peculiar to one or other of the economic and social systems. In the early post-war years, the development both of the Mezzogiorno and of Slovakia was related directly to the social and economic features which created *in situ* the imperatives for political action. Land reform and agricultural improvement dominated the first ten years of the investment of the Cassa per il Mezzogiorno while the industrialization of Slovakia was effected by absorbing surplus labour in the rural areas. It was evident that the respective governments at first regarded the Mezzogiorno and Slovakia as peripheral regions which at best could be integrated into the rest of the national economy. Their geographical eccentricity with regard to the European arterial transport system of the 1950s—which meant the under-developed state of their railways—seemed not only to limit new development to projects of localized or regional importance but also to carry the risk that the development would take a very long time to become self-sustaining. Today, the development of the Mezzogiorno and of Slovakia exemplifies expectations of new technology of transport, motorized and multi-modal. The industrial poles of Košice and of Taranto and Bari are no longer regional but national and international in scale. It is clear that they are regarded as viable centres for European supply, production and marketing in their own right—in fact they are no longer regarded as geographically eccentric. Furthermore, the international tourist industry, one of the fastest growth areas of the European economy, would need little convincing of the potential "centrality" of the mountains of the Tatras or of the coasts of Calabria.

Massive motorization has brought about a fundamental change in the concepts of urban planning in western Europe. Similar changes are taking place in planning concepts in eastern Europe. There is of course nothing new in traffic congestion in urban streets. Official reports on horsedrawn traffic congestion in London and Paris in the nineteenth century threatened complete standstill within a matter of years. What has brought about the change in post-war urban planning is the infinitely greater mobility and flexibility in distribution that can be obtained from motorized transport. This has had two main effects. First, the actual built-up area of towns is no longer regarded as adequate geographically for urban planning, because modern transport has made possible the dispersal of population and employment. Secondly, the development of the built-up area itself is no longer planned primarily in terms of land use and building regulations but also in terms of land use related to transport possibilities; the needs of access, parking, traffic management and intermodal transfers are increasingly regarded as determining factors.

So far, planning authorities in Europe have concerned themselves mainly with the division of passenger movement between the various modes, because the problems of motor traffic congestion and of facilities for travel for the urban labour force have an inevitable political priority. Within this area, the technical and financial problems of developing more efficient public transport systems as ways of relieving congestion and pollution are only beginning to be faced in western Europe. While the use of the private car, particularly within cities, may express users' preferences, the preference is hardly absolute; it must depend in part on relative advantages in relation to alternative ways of travel. The vicious circle of falling relative utilization of public transport accompanying falling quality of service (and rising price) is still unresolved. It is however clear that in many cities the pressures to devote such large resources to road improvements and parking facilities have imposed severe constraints upon other possible ways of maintaining the desired mobility and of lessening the dominance of traffic planning over other aspects of urban design.

Necessary though the preoccupation with passenger transport may be, there is some danger that urban planners may have been taking too narrow a view of the importance of transport for the creation of high quality urban environments. Cities depend not only on well managed movements of passengers but also on very complex systems for the supply of, for example, energy and water and for the distribution of goods. Increasing attention is being given by regional and urban planners to the totality of urban transport systems, in particular to the problems of goods distribution in urban regions and to the satisfactory linking of inter-city commercial transport with developing urban distribution systems that are designed as much for environmental conservation as for commerce. The successful realization of more human and environmentally-conscious conceptions of city planning will undoubtedly depend in large part on the ability of planners to set aside narrow preoccupations with passenger traffic management in favour of a deeper understanding of the potentiality of modern transport *as a whole* to enhance the human condition.

Intergovernmental collaboration in the 1970s

The ECE has provided an invaluable lesson in the importance of relating intergovernmental collaboration to the development of the technology of the particular fields of co-operation. Before the Second World War, intergovernmental collaboration in transport was confined to individual modes of transport, for example, railways or waterways. The creation of the ECE Inland Transport Committee in 1947 was a pioneer step whereby Governments were able to tackle comprehensively the problems of the whole of the inland transport system of Europe. A decade later, the Inland Transport Committee was adapting its programmes of work to keep pace with technological change, in particular in the area of combined transport and container traffic. In the 1960s, the Committee extended its activities to such measures as the revision of the E-Route system and the harmonization of inland waterway régimes in response to the increasing desire for European integration, and to the regulation of motor-vehicle construction and of the carriage of dangerous goods in response to the increasing concern, both in Europe and the world generally, with environmental factors. In the 1970s, the success of international collaboration in European transport will depend upon the ability of governments to continue the permanent adaptation of their programmes to changing technology and political concerns, and to accept consciously the imperatives of a motorized and multi-modal transport system in Europe.

In practical terms, there would seem to be three main fields for future intergovernmental collaboration in European transport.

(a) *Harmonization of régimes.* It is essential for trade and travel in Europe that the various national systems of regulation and commercial practice, to which frontier-crossing transport is subject, should be the same in their incidence throughout Europe. This process of harmonization is a well established function of the ECE. It concerns such régimes as the rules of the road and the rules for inland navigation, the safety requirements for vehicles and transport equipment used in international trade, the practice of customs and other public authorities in the control of international freight movements and the systems for carriers' liability. The results of ECE activities include, for example, the TIR (Transport International Routier) convention providing for international road transport of goods under customs seal.

(b) *Common development of equipment.* In a multi-modal transport system, at a time when industrial production is becoming increasingly sophisticated and international trade more widespread, the cost of specialized equipment becomes prohibitive unless full utilization can be ensured. This can no longer be expected for many ranges of specialized vehicles and loading equipment unless there are substantial possibilities for use in international trade. The most spectacular recent example of a decision to develop equipment for fully European use has been the collaboration of railway administrations in the simultaneous introduction of automatic coupling or rolling stock. Similar measures have been taken for the introduction of equipment used for carrying dangerous goods and for the standardization of freight containers. If the full benefits of progress in production are to be realized, this kind of collaboration will have to be increased during the 1970s, with a view to the development of international pooling of equipment for use in transport operations.

(c) *European infrastructures.* In the 1970s Governments will continue to face the problem of co-ordinating investment in the infrastructures for the different modes of transport. But they will increasingly face the more novel problem of co-ordinating their invention and prototype development programmes. The putting into operation of fast passenger train services using new or improved technology is an obvious example. But, as mentioned earlier in this chapter, the most important task is likely to be the co-ordination of investment in commercial transport systems with investment in the new urban distribution systems now being developed to achieve high environmental standards as much as commercial viability.

CHAPTER 8

THE IMPACT OF TECHNICAL PROGRESS

Introduction

Technical progress has played an outstanding part in the pattern of economic development since the war. The economic expansion owes much to a tide of innovations ranging from space satellites and nuclear energy to computers and compound antibiotics which have both enhanced the productivity of labour and capital and radically altered ways of life. As a result, for most of the decade following the launching of the first sputnik, there was an almost Faustian confidence in the power of contemporary technology to improve the levels and transform patterns of production and consumption. Technological change and material progress were often considered to be cause and effect: welfare was held to depend on economic growth, which in turn required innovation, which in turn depended on research and development. This led governments to devote financial and manpower resources on an unprecendented scale to "the invention industry". Towards the end of the period, however, this approach was being increasingly called in question. As evidence of, and concern with, the degradation of the environment accumulated, contemporary technology was held to be responsible, and economic growth was less universally regarded as a paramount objective of policy. Consequently, the suitability of governmental systems and institutions of decision-making, directed to the economic applications of science and technology, began to be re-examined. At the same time, the rate of increase of expenditure on research and experimental development began to be curbed in many countries and interest revived in international co-operation, especially within sub-regional groupings, as a possible means of reducing the costs and limiting the adverse environmental effects of technological change.

It is impossible here to trace in detail the impact of technical progress on the economies, institutions and policies of ECE countries. This chapter is therefore limited to a number of questions directly relevant to the policy choices that have had to be made during the past two decades. These are:

First, the question of measuring how the resources allocated by ECE countries to the development of science and technology (the "inputs") have increased, and changed in composition or application, over the period. What contribution have these resources made to economic growth (the "output")? These questions are treated in section (i).

Secondly, the question—considered in section (ii)—of establishing whether some branches of the economy have been more responsive to the generation and diffusion of innovations than others and whether some innovations have had more far-reaching effects, either singly or in combination, than others.

Thirdly, the interaction between technical progress and the development of international trade raises several questions concerning competing objectives of policy in respect of the international transfer of technology, the choice of patterns of specialization, industrial concentration, etc. These are considered in section (iii).

(i) The cost of technical progress and its contribution to economic growth

Partly under the influence of the powerful stimulus to technological competition imparted by the Second World War and its aftermath, the last two decades have been characterized by organized innovative activity on an unprecedented scale. Governments and enterprises have vastly increased the absolute and relative amounts of national resources devoted to the whole spectrum of activities—ranging from the training of highly qualified engineers and scientists (QESs), through basic and applied research and development (R and D), to the introduction and diffusion of new technologies. By way of illustration, at the end of the period the ECE region was employing almost 2 million QESs—or four times as many as at the beginning of the 1950s—and was spending something like $40–50 billion annually in research and development.

The exceptional and growing importance ascribed to scientific and technological effort and attainment appears to have been due to a widespread belief that technical progress is a major source of economic growth and international competitive success, whether at the enterprise or governmental level. An increased share of national intellectual and material resources devoted to research or innovation would be justified, on this reasoning, by the resultant increase in rates of economic growth and levels of material welfare. Moreover, the concomitant increase in knowledge would be valuable not only as a source of wealth but also as a contribution to a long-standing goal of social policy in all countries—a better educated population. In short, from the point of view of governments and enterprises, investment in the "invention industry", like investment in "human capital", has been judged to be rewarding, holding out the promise of at least as satisfactory a rate of return as investment in enlargement of capacities with stable technology. The very fast expansion and high level of profitability of innovating enterprises in research-intensive branches of technology such as computers or xerography lent support to this view during most of the period.

Whether any form of investment proves to be worthwhile or not depends in large measure on the level and rate of growth of demand for the goods or services that it provides. Put differently, if there had not been a strong demand on the part of final consumers for the new or improved products and services generated by technical progress it is unlikely that the innovative efforts of the post-war period would have been sustained at so high a level for so long. Has the supply of innovations created its own demand, in accordance with Say's law, (assisted by intensive advertising, in itself incomparably more effectively widespread in many countries thanks to technical progress), or have consumers, as they entered hitherto unattainable ranges of affluence, acquired new patterns of innovation-oriented demand?

The questions just raised obviously do not exhaust those that are of interest in trying to understand the nature and relative importance of the contribution made by technical progress to economic growth and welfare in the post-war period. If, for example, full-cost accounting—including long-run social costs—were practised, the depletion of natural resources would have to be set against the growth- or welfare-inducing benefits of certain innovations before their contribution to net social utility could be assessed.

In what follows attention has been concentrated on the following questions:

- How large an effort (input) has been made by ECE countries to encourage technical progress and how has it developed over the period under review?
- What has been the relative importance of such expenditures in relation to those on other objectives of policy?
- What has been the rate of return, in terms of a faster growth of output?

Ideally, measurement of society's total technological "input" would encompass not only the resources devoted to *invention* (the establishment of the scientific or technical feasibility of a new product or process), to *innovation* (its production on a commercially viable scale) and *diffusion*, but also the rate of utilization of the existing stock of knowledge. Unfortunately no such composite measure of input has yet been devised, nor have the underlying statistics been collected. Consequently, analysis of inputs must rest on statistics of resources devoted to the process of research and experimental development, through which inventions are generated and the ground prepared for innovations.[135] These have been estimated to amount to only about one-third of the total expenditure of industry on technical progress, from the initial stage of oriented basic research to the commercialization of the resultant product. Concentration of attention on resources devoted to R and D therefore leads to underestimation of the share of national resources going to technological development as a whole.

TABLE 8.1

Qualified engineers and scientists (QES), R and D expenditure as a percentage of national product and average annual growth of R and D expenditure

(Current prices)

Country	*No. of QES in R and D 1967*	*Percentage distribution*	*R and D expenditure as a percentage of GNP ca. 1963*	*Average annual growth of R and D 1963–1967*
Austria	2 401	0.1	0.3	28.0
Belgium	7 945	0.5	1.0	6.5
Bulgaria	9 427[a]	0.5	1.4	..
Czechoslovakia	39 591[b]	2.3	3.1	11.9
Denmark	8 000	0.5	0.7[c]	..
Fed. Rep. of Germany	61 559	3.6	1.4	13.2[d]
Finland	2 026	0.1	0.6[c]	..
France	49 224	2.9	1.6	17.9
German Democratic Republic	..	..	3.0[e]	..
Greece	1 217[f]	0.1	0.2	19.4[g]
Hungary	16 285[b]	0.1	1.5	5.4
Iceland	..	..	0.4	13.8
Ireland	1 630	0.9	..	..
Italy	27 755	1.6	0.6	11.3
Japan	..	..	1.3	17.2
Netherlands	20 500	1.2	1.9	15.9[d]
Norway	6 038[b]	0.4	0.7	17.6
Poland	44 978[f]	2.6	1.5	15.0[h]
Portugal	1 461[i]	0.1	..	..
Romania[j]	29 728	1.7	1.0[j, m]	13.3[h]
Soviet Union	770 013[f, k]	44.7	3.6[j, e]	..
Spain	3 842[b]	0.2	0.2	19.2
Sweden	6 566[f]	0.4	1.4	9.3[d]
Switzerland	10 510	0.6	1.9[c]	..
Turkey	..	..	0.4[i]	..
United Kingdom	53 865[l]	3.1	2.3	6.9[d]
United States	537 273	31.2	3.5	3.9[n]
Yugoslavia	9 453	0.5	0.8	20.0[d]
	1 721 338	100.0		

Sources: OECD, *International Statistical Year for R and D 1963–1964*, vol. 2 and vol. 5, *1967*, *Statistical Tables and Notes*, Paris; UNESCO, *Statistical Yearbook 1969*, Paris 1970; *Economic Survey of Europe in 1969*, part II, p. 78.

[a] 1966.
[b] Includes humanities.
[c] 1967.
[d] 1964–1967.
[e] 1968.
[f] Full-time equivalents.
[g] 1964–1966.
[h] 1965–1967.
[i] 1964.
[j] Excluding development.
[k] Scientific workers in all fields.
[l] 1965, Great Britain only.
[m] 1969.
[n] 1963-1966.

NOTE. — Social sciences are in principle included, but are specifically excluded in Greece, Italy, Portugal, Sweden, the United Kingdom and the United States.

Except in the Soviet Union and the east European countries, regular statistical series of manpower engaged in, and expenditure on, research and development have been maintained by most industrial countries only since the early 1960s. Since then the international comparability of such statistics has greatly improved, but many weaknesses remain, and time series for long periods are not available. The numbers of highly-qualified manpower in R and D in 1967 are shown in table 8.1. A striking feature

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[135] Some inventions and innovations—especially improvements in processes—are, of course, developed at the work-bench and do not result from organized R and D. This, and "learning by doing", are factors that must be borne in mind in framing national policy and in making international comparisons.

TABLE 8.2

Government expenditure on R and D in relation to total general government expenditure
(Current prices)

Country	*Period*	*Government expenditure on R and D as a percentage of total government expenditure at beginning of period*	*Average annual growth rates*		*Ratio of column (3) to column (4)*
			Government support of R and D	*Total general government expenditure*	
Austria	1963–1967	0.4	26.0	10.3	2.5
Belgium	1963–1967	0.7	4.5	12.2	0.4
Canada	1963–1967	1.8	17.6	11.4	1.5
France	1963–1967	2.7	14.0	9.5	1.5
Federal Republic of Germany	1964–1967	1.5	18.0	8.5	2.1
Greece	1964–1966	0.5	2.9	15.8	0.2
Ireland	1963–1967	0.9	9.3	12.1	0.8
Italy	1963–1967	0.6	13.1	11.0	1.2
Japan	1963–1967	1.6	19.7	15.0	1.3
Netherlands	1964–1967	2.0	14.9	14.0	1.1
Norway	1963–1967	1.1	19.4	12.3	1.6
Sweden	1964–1967	1.7	5.3	13.7	0.4
United Kingdom	1964–1967	3.5	5.8	10.4	0.6
United States	1963–1966	7.8	1.2	8.9	0.1

Sources: Government expenditure on R and D: OECD, *International Statistical Year for R and D 1963–1964*, vol. 2, Paris 1968; and *International Statistical Year for R and D, 1967*, vol. 5, Paris 1970. Total general government expenditure: OECD, *National Accounts Yearbooks* and United Nations, *Yearbooks of National Accounts Statistics*. The data cover total current expenditure plus gross fixed capital formation.

is the very large proportion accounted for by the Soviet Union and United States, with 45 per cent and 31 per cent of the total, respectively, followed by the Federal Republic of Germany (3.6 per cent), United Kingdom (3.1 per cent), France (2.9 per cent), Poland (2.6 per cent) and Czechoslovakia (2.3 per cent). While these relative magnitudes reflect to some extent differences in size of population, they do not correspond closely to the relative sizes of the economies and are presumably related to other factors such as the composition of R and D activities and the importance of defence R and D. In table 8.1, financial measures of national R and D effort are also shown.

These data probably indicate a broadly comparable share—some 3 or 4 per cent—of national resources devoted to R and D by the United States and the Soviet Union in the mid-1960s. The figures also indicate the rapid growth of R and D expenditure over the short period for which information is available. Within the general tendency for R and D to increase as a proportion of national product, there appears to have been a slight tendency to levelling out, with the lagging countries catching up.

The changing share of government expenditure on R and D in total government expenditure is shown in table 8.2. The United States seem to have had twice as large a government commitment to financing inventive activity (devoting 7.8 per cent of total government expenditure to R and D) as France or the United Kingdom (approximately 3 per cent) and three times as large as, the Federal Republic of Germany (1.5 per cent) and Canada (1.8 per cent). Rates of growth of government expenditure in support of R and D, in relation to total government expenditure, do not suggest any clear over-all trend.

As a reflection of the relative priority attached by governments to R and D it is interesting to compare the growth rate and share in total government spending of outlays of R and D with government expenditure on other major objectives of policy such as defence, education and health (see table 8.3).[136] Again, over the decade considered, the tendency was for government financed R and D to grow as a proportion of GNP, with a decline only in the United Kingdom. In Austria, Japan, the Netherlands and Norway, R and D expenditure as a share of GNP grew faster than expenditure on defence, education or health. In the United Kingdom, expenditure on R and D declined less as a proportion of GNP than defence expenditure. In the United States and Sweden, the share of both health and educational expenditure grew faster as a proportion of GNP than R and D expenditure. It should be noted, however, that among the four countries where R and D as a proportion of GNP was growing fastest three had below-average R and D expenditures as a proportion of GNP in 1963 (see table 8.1). Here again the statistics may simply reflect a levelling-out by which R and D expenditure has caught up with the other categories

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[136] Expenditures on defence and education both, of course, include some R and D expenditure and vice versa, and this clouds the comparison to some extent.

TABLE 8.3

Relative growth rates and proportions of general government expenditure on defence, education, health and R and D for selected ECE countries and Japan, 1955–1965

(Average annual rates at current prices)

A = Average annual rate of growth
B = Ratio to average growth of GNP

Country and category	*GNP* 1955–1965	*Defence expenditure* 1955–1965	*Educational expenditure* 1955–1965	*Health expenditure* 1955–1965	*R and D expenditure* 1959–1966
Austria[a]					
A.	8.1	8.1	9.1	8.7	28.0
B.	1.0	1.0	1.1	1.1	3.4
Japan					
A.	13.9	15.6	14.4	..	18.5
B.	1.0	1.1	1.0	..	1.2
Netherlands					
A.	8.6	4.7	5.4	..	10.1[b]
B.	1.0	0.5	0.6	..	1.6[b]
Norway[a]					
A.	7.3	7.3	12.0	11.4	18.0
B.	1.0	1.0	1.6	1.6	2.1
Sweden					
A.	8.4	7.5	11.7	9.8	9.0[b]
B.	1.0	0.9	1.4	1.2	1.0[b]
United Kingdom					
A.	6.4	3.9	10.5	8.3	5.0
B.	1.0	0.6	1.6	1.3	0.7
United States					
A.	5.6	2.7	10.3	8.4	8.6
B.	1.0	0.5	1.8	1.5	1.3

Sources: General government expenditure on defence, education and health derived from OECD, "Public Expenditure Trends" in *Occasional Studies*, Paris, July 1970. R and D expenditure: Japan, Norway, United Kingdom and United States from UNESCO, *Science Policy from the standpoint of Policy-making Bodies in Europe* (UNESCO/MINESPOL 4) Paris 1970, p. 18; other countries from first source quoted for table 8.2.

[a] 1957–1966 for GNP, and outlays on defence, education and health (Austria and Norway); 1963–1967 for expenditure on R and D (Austria only).

[b] 1964–1967.

of expenditure considered. The figures suggest that over the period government R and D expenditure may in general have been growing faster than government expenditure on defence, education and health.

One characteristic of national R and D expenditures should be noted. An important component of the R and D of some countries is not "economically motivated"; that is to say, countries spend varying proportions of their total R and D on defence, space, and nuclear R and D. The result of eliminating defence, space and nuclear R and D from the comparison is to reduce substantially the range of proportions of R and D in GNP among the countries listed (see text-table below). Countries with the largest total R and D proportion of GNP tend to have the largest shares of defence, space and nuclear R and D. Thus the United States, the United Kingdom and the Netherlands with respectively 3.5 per cent, 2.3 per cent and 1.9 per cent of GNP going into total R and D have only respectively 1.0 per cent, 1.2 per cent and 1.3 per cent of GNP going into economically motivated R and D.

Total R and D as a percentage of GNP and economically motivated R and D as a percentage of GNP for selected countries in 1963

	Total R and D as a percentage of GNP (1)	*Economically motivated R and D as a percentage of GNP* (2)
Austria	0.3	0.2
France.	1.6	0.6
Federal Republic of Germany . .	1.4[a]	0.9
Italy.	0.6	0.4
Japan	1.3	1.0
Netherlands	1.9[a]	1.3
Norway	0.7	0.4
Sweden	1.4[a]	0.8
United Kingdom	2.3	1.2
United States.	3.5[a]	1.0

Sources: Column (2) is from UNESCO, *Science Policy from the Standpoint of National Economic Policy-making Bodies in Europe,* UNESCO/MINESPOL 4, Paris 1970, p. 18. Column (1) is from table 8.1.

NOTE.—"Economically motivated" R and D includes expenditures on commercial and industrial R and D, on R and D for the economic infrastructure, and on agricultural R and D. Expenditures on defence, space, welfare and some nuclear R and D are thus excluded.

[a] 1964.

Table 8.4

Estimated contribution of factor inputs and output per unit of input to economic growth in selected market economies

	Japan	*United States*	*Belgium*	*Denmark*	*France*	*Federal Republic of Germany*	*Nether-lands*	*Norway*	*United Kingdom*	*Italy*
Growth rate of real national income	10.1[a]	3.32	3.20	3.51	4.92	7.26	4.73	3.45	2.29	5.96
Total factor input	4.03	1.95	1.17	1.55	1.24	2.78	1.91	1.04	1.11	1.66
Labour	1.31	1.12	0.76	0.59	0.45	1.37	0.87	0.15	0.60	0.96
Employment	1.03	0.90	0.40	0.70	0.08	1.49	0.78	0.13	0.50	0.42
Hours of work	−0.07	−0.17	−0.15	−0.18	−0.02	−0.27	−0.16	−0.15	−0.15	0.05
Age, sex composition	0.21	−0.10	0.08	−0.07	0.10	0.04	0.01	−0.07	−0.04	0.09
Education	0.14	0.49	0.43	0.14	0.29	0.11	0.24	0.24	0.29	0.40
Capital	2.72	0.83	0.41	0.96	0.79	1.41	1.04	0.89	0.51	0.70
Output per unit of input (the residual)	6.1	1.37	2.03	1.96	3.68	4.48	2.82	2.41	1.18	4.30
Residual as a fraction of total growth	0.60	0.41	0.63	0.56	0.75	0.62	0.60	0.70	0.52	0.72

Sources: E. F. Denison, *Why Growth Rates Differ*, The Brookings Institute, Washington, D. C. 1967, p. 192 for all countries except Japan; H. Kanamori, "What accounts for Japan's high rate of growth", paper presented to Twelfth General Conference of International Association for Research in Income and Wealth, 1971, Ronneby, Sweden for Japanese figures.

NOTE. — The estimates relate to 1955–1968 for Japan, 1950–1962 for other countries.

[a] Real GNP.

So much, then, for the "R and D component" of the input into technological advance. The statistics, despite their gaps and often poor comparability, suggest an impressive growth in the resources allocated to this purpose. What return has been obtained, or—given the sometimes considerable lags between input and output—may still be expected to result, from this considerable investment? It is not possible to quantify the contribution made by technical progress, narrowly defined, even to the growth of material welfare, defined in terms of national output or income. The difficulty is that technical progress is so intimately linked with the factors of growth, and the ways in which they are combined, that it is impossible to separate out and measure its growth-inducing effects apart from those of the quantity and quality of labour and capital.

For almost fifteen years now the question of how best to measure the contribution of technical progress to economic growth has been highly controversial. The results obtained by one well-known approach are shown in table 8.4. The approach consists in attempting to measure "total factor productivity" by first identifying the separate contributions made to growth by labour and capital, on the assumption that factor shares in income reflect their marginal productivity.[137] Calculations are also made of the effect of various influences on the quality of labour such as changes in the length of the working week, in the age-sex composition of the labour force, and its level of educational attainment. Capital-inputs are also disaggregated. After deducting from the growth in total output the contribution of each of these input factors, there remains a "residual" which can be described as a measure of total factor productivity, shown in the bottom row of the table; this residual typically appears to account for between a half and two-thirds of the growth rate of output, the proportion being roughly correlated with the rate of growth itself. The residual, which is obviously sensitive to the definitions and methods of measurement of capital and labour inputs, clearly includes a large contribution from technological progress in a broad sense, but may incorporate many other factors as well.

As regards the number of innovations generated in different countries comparative statistical studies have had to be limited to lists of "major innovations", given the difficulty in deciding where to draw the line between uncontested novelties such as the printed miniaturized circuit, laser or the float-glass process and minor, yet valuable, technical improvements in an existing product, such as carbon-tempered razor blades.[138] The data (foot of page) on patents applied for and granted are not a substitute for such a series, but nevertheless indicate the vast increase that has occurred according to one legal-commercial indicator of innovative activity.[139]

A study of the origin of 140 innovations over the past 15–20 years in industrially advanced market economies [140] did not reveal important differences in national rates of innovation when these are related to economic size. Thus, 60 per cent was found to have originated in the United States, which roughly corresponds to that country's share in the combined national product of OECD member countries, with the United Kingdom and the Federal Republic of Germany providing 15 per cent and 10 per cent respectively—again a proportion broadly corresponding to their income ranking. This is not to deny the "advantages of bigness", however, since an absolute lead in the number of innovations can confer competitive advantages on the innovative leader's export performance, sometimes resulting from economies of scale. The United States is often considered to enjoy just such "advantages of bigness" on account of the size and prosperity of its domestic market and it is believed to exploit them successfully on international markets through the powerful network of United States-based multinational corporations. In conjunction with the countervailing advantages of specialization exploited by certain smaller countries, this might in part account for the declining share of the United States in world exports of certain research-intensive products (see below).

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[137] This approach is associated with Edward Denison, who was its pioneer. A discussion of its limitations is contained in the *Economic Survey of Europe in 1961*, part 2, "Some Factors in Economic Growth in Europe in the 1950s", chapter V.

[138] It may be noted in passing that many of the innovations which appear to have the most revolutionary economic consequences—such as the computer, or communication satellites—result from the combination of several separate innovations; the ability to recognize and exploit to combined potential of separate innovations may be of decisive importance in achieving innovative leadership.

[139] Many new processes or products are, of course, deliberately withheld from patenting, so that registered patents reflect only an indeterminate part of R and D output.

[140] OECD, *Gaps in Technology, General Report*, Paris, 1968.

	Applications for patents			*Number of patents granted*		
	1950	*1960*	*1969*	*1950*	*1960*	*1969*
Belgium	7 299	12 506	17 614	7 226	12 400	17 532
France	24 800	36 446	45 393	17 800	35 000	32 020
Federal Republic of Germany	53 375	57 123	66 626	23 830	19 666	22 623
Italy	14 347	22 667	33 129	6 900	13 396	21 000
Netherlands	7 479	12 629	19 700	2 143	3 530	2 152
Switzerland	11 331	14 664	19 524	6 728	7 269	..
United Kingdom	31 686	44 914	63 614	13 509	26 775	38 790
United States	67 369	79 721	101 515	43 129	39 574	67 557
Japan	16 896	43 484	105 586	4 272	11 252	27 657

Source: Secretariat of WIPO/OMPI (World Intellectual Property Organization).

(ii) The diffusion of innovation

It is very probable that the speed and extent of industrial application of innovations is a more important explanation of differences in levels of productivity and growth rates of output than international differences in the number of innovations generated. The speed of such diffusion within and between industrial branches is affected by such factors as capital investment and replacement policies, relative factor prices (including the availability of finance and specific types of know-how), and estimates of prospective market developments and market structures. As a result of differences in these factors, and in the success of governmental policy in creating a favourable "climate for innovation", there are often considerable lags in the diffusion of technology as well as a wide spread within industries between enterprises using "best-practice" and "average" plant and equipment.[141] An analysis of inventions in the United States found that the rate of diffusion was positively correlated with the profitability of the innovation but negatively correlated with the size of investment required.[142] Such evidence as is available indicates that the increase in industrial concentration (accompanied by a reduced share of small-size plants in the total industrial establishment) and more intensive international trade in manufactures have tended to reduce the spread between "best-practice" and "average" technology.

Some examples may be given of the diffusion of products of "research-intensive" branches of industry—i.e. those branches where the proportion of R and D expenditure or employment is clearly higher than average. The research-intensive branches have tended to grow faster than the others and this in itself provides indirect confirmation of the increasing share of relatively new products in total output and consumption.

The computer branch of the electronics industry is particularly interesting on account both of its research-intensiveness and of its catalytic effect on innovations in other branches, notably by means of numerically controlled automatic devices and rapid processing of information. The computer industry is a classic example of the recognition and exploitation by United States enterprises of theoretical research originally carried out in Europe; it is also one of several research-intensive branches which benefited from substantial Governmental financial support motivated partly by defence objectives. The statistics (at foot of page) indicate the research-intensiveness of the branch, the distribution of R and D effort amongst the major producing and exporting countries, and the preponderance of the United States in this branch.

The computer industry has a number of other features characteristic of research-intensive branches of manufacturing. Its growth rate has been astoundingly fast. Its high research-thresholds (the minimum expenditure on research below which competitive success in generating innovation is virtually impossible) have led to the concentration of manufacture in a relatively small number of large-scale enterprises—in recent years some eighteen mainly multinational enterprises in the market economies, over half of which had annual sales (sometimes including other equipment) exceeding $1 billion. Computer technology has also developed very rapidly, with a concomitant high rate of obsolescence of first and second generation installations. Thus, between 1955 and 1970 the calculation speed of best-practice computers rose from 10 to 70,000 thousand additions per second, the cost per calculation unit falling simultaneously from $60 to $0.1. Partly because of intense technological competitiveness, detailed and comparable statistics of the distribution by branches of industry, vintage, and use of installations are not available. Sample surveys in OECD countries indicate that 60–80 per cent of installed computer capacity in western Europe is of third-generation vintage and that over 20 per cent is in the metallurgical and engineering branches; another 20 per cent is equally distributed between the commercial, banking and insurance sectors, and computer-research centres (time-sharing units) account for some 8 per cent of total installed capacity.[143]

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[141] See G. F. Ray, "The Diffusion of New Technology", *National Institute Economic Review*, London, May 1969.

[142] Edwin Manfield, *Industrial Research and Technological Innovation: an econometric analysis*, New York, 1968.

[143] ECE, *Economic Aspects of Automation*, 1971.

R and D expenditures and employment in the computer industry

Country	*Expenditure $ million*	*Expenditure as percentage of net output*	*Employment in R and D*	*Employment in R and D as percentage of total employment*
United States (1966).	470	15	15 000–20 000	. .
France (1965).	24	12.5	2 750	17
United Kingdom (1965)	34	18	3 400	9
Federal Republic of Germany (1966)	20	10	2 300	9
Japan (1965)	13	15	3 300	20
Italy (1965–1966)	n.a.	<5	n.a.	10

Source: OECD, *Gaps in Technology—Computers*, Paris 1970

The country-by-country and regional distribution in 1970 has been estimated as follows:

Estimated number of computer installations

Federal Republic of Germany	6 100
United Kingdom	5 900
Japan	5 900
Soviet Union	5 500
France	4 500
Canada	3 000
Italy	2 700
Scandinavia	1 500
Netherlands	1 100
German Democratic Republic	500
Poland	420
Czechoslovakia	200
Yugoslavia	180
Hungary	120
Romania	50
Bulgaria	30

Source: Ivan Berenyi, *Scientific American*, October 1970.

While the rapid diffusion of computer technology is particularly striking, and captures the imagination because of its revolutionary consequences in many spheres of economic and social activity (including education), many of its characteristics—high entrance and viability thresholds for research, research intensiveness, catalytic effects on innovation elsewhere, concentration of production and trade in a small number of predominantly multinational enterprises—occur in other research-intensive industries. The chemicals industry, particularly the pharmaceuticals branch, offers many similar examples ranging from man-made non-cellulosic fibres to plastics and antibiotics. Non-cellulosic fibres, for example, accounted for only one per cent of world production of textile fibres in 1950 but now account for some 20 per cent. Even branches which are not conspicuously research-intensive, such as non-ferrous metal-working, have radically changed their methods of production and composition of final output in response to the diffusion of innovations originating both inside and outside the branch. Thus, the past twenty-five years have seen the introduction of the continuous casting of aluminium and copper, the development of new uses for these metals, and the production of new metals such as germanium, titanium and tantalum—largely in response to the demands placed on the industry by the requirements of technological change in solid-state electronics and aerospace engineering.

(iii) Trade in research-intensive goods and the transfer of technology through trade

The development and commercialization of new or improved products and production processes has many effects, some of which are difficult to trace or to quantify, on the volume and pattern of international trade. This is particularly true of trade in research-intensive industries.[144] Hence, trade in the products of research-intensive industries is of particular interest as part of any analysis of the economic consequences of devoting national resources to technical progress. Further, since production technology is, in part, shaped by importing or exporting capital goods (of which an important proportion are research-intensive) trade in these goods amounts to trade in technology.

As was shown in chapter 2, the rate of expansion of international trade between 1955 and 1969 at an annual rate of 7.5 per cent was accompanied by a growth of trade in manufactured goods at an annual rate of 9 per cent so that their share rose from 54 per cent of total trade at the beginning of the period to 65 per cent at the end. Trade in research-intensive manufactured products increased at an annual rate of over 12 per cent over the same period and their share rose from 15 per cent of total trade in manufactures to over 20 per cent. Trade in engineering products (which largely overlap trade in research-intensive goods) grew at an annual rate of 11.3 per cent, its share rising from 37.5 per cent of trade in manufactures in 1955 to 44 per cent in 1969.

Two aspects of the expansion of trade in research-intensive products and engineering goods are examined here. The first is the inter-country structure of exports in these two categories of goods and shifts in these patterns over time. Shifting patterns of exports of research-intensive goods give some indication of the success, in terms of exports, of national policies for science and technology and shifting patterns of exports in engineering goods give some indication of a country's balance as an importer or exporter of technology through trade. The second aspect is the change in export patterns of these goods within particular countries. Attention is focused on national export specialization with a view to discovering whether exports of research-intensive goods have tended to become more specialized, which would have important consequences for national policies in respect of international competition and co-operation.

The inter-country structure of exports in research-intensive and investment goods

The expansion of trade in research-intensive and engineering goods has been accompanied by a shifting structure of trade. Not only have these two categories been growing as a proportion of total trade, but within these two categories the country structure of trade has been shifting (see table 8.5 showing the shares of nine ECE countries plus Japan in the combined exports of the twelve principal world[145] exporters of engineering products). In table 8.5 the engineering industry is divided into five main sub-groups: research-intensive goods, investment goods, heavy transport equipment, passenger cars and accessories, and other consumers' durable goods. The category of research-intensive goods is further divided into eight sub-categories.

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[144] Aircraft, electronics, drugs, electrical machinery, chemicals, machinery and instruments.

The shares of the United States and United Kingdom declined steeply in each of the five main categories of engineering exports between the mid-1950s and mid-1960s, while those of Japan, the Federal Republic of Germany and Italy increased substantially. France, the Netherlands, Belgium-Luxembourg and Sweden also increased their shares of engineering exports, although not in every category. The shares of the United States and United Kingdom also declined in exports of both research-intensive products and investment goods while all other countries gained ground. Examination of the eight research-intensive products show a similar pattern of development.

Before attempting to interpret these changes in the structure of exports of research-intensive and investment goods, it should be borne in mind that only research-intensive engineering goods are shown in table 8.5. How far the category of research-intensive engineering goods is representative of all research-intensive goods may be estimated on the basis of the proportion of total business-sector R and D expenditure devoted to engineering goods in eleven countries in a year around 1963. The average proportion is a little over 50 per cent. Hence, the exports of research-intensive engineering goods considered above may be characteristic of no more, on average, than about half of national R and D activities.[146]

The chemicals industry accounts for another large segment of business-sector R and D activity—on average some 25 per cent of the R and D of the eleven countries listed in table 8.6. The pattern of shares in world exports of pharmaceuticals over the 1954–1966 period developed along very similar lines to that in engineering products. The share of the United States fell substantially, that of the United Kingdom slightly. Switzerland also saw its share decline, but all remaining countries gained ground, notably the Federal Republic of Germany, the Netherlands and Italy.

TABLE 8.6

Shares of combined exports of pharmaceuticals of selected ECE countries, Canada and Japan in 1954 and 1966

(Percentages)

Country	*1954*	*1966*
United States of America	39.1	18.8
Federal Republic of Germany	7.8	18.1
United Kingdom	15.0	14.3
Switzerland	16.0[a]	14.1
France	10.4	11.3
Netherlands	2.3	5.5
Italy	2.6	5.2
Japan	1.3[a]	2.3
Denmark	1.7	2.3
Belgium-Luxembourg	1.7	2.3
Canada	0.9	1.2
Sweden	0.6	1.2
Ireland	—	1.1
Yugoslavia	—	0.6
Portugal	—	0.5
Others	0.7	1.1
Total	100.0	100.0

Source: OECD, *Gaps in Technology, Pharmaceuticals*, Paris 1969, p. 42.

[a] OECD estimate.

Taking a summary view, in the mid-1950s the United States and the United Kingdom together accounted for a major proportion of trade in research-intensive and investment goods—roughly 75 per cent of exports of research-intensive engineering goods, 54 per cent of exports of pharmaceuticals[147] and 70 per cent of exports of investment goods. By the mid 1960s their share of research-intensive engineering exports had dropped to 50 per cent, of pharmaceutical exports to 33 per cent (47 per cent if Switzerland is included), and of investment-good exports to 44 per cent. Countervailing gains were made primarily by the Federal Republic of Germany, Japan, Italy and, less markedly, by the Netherlands, France, and Belgium-Luxembourg.

Export specialization in research-intensive goods

To what extent has the impressive dynamism of trade in research-intensive products and investment goods, which characterized the post-war growth of international trade, been accompanied by increased international specialization in such trade? *A priori*, the high "threshold" costs of industrial innovative activity, the large scale of production dictated by much contemporary technology, and the changes in technological leadership resulting from shifting levels of domestic economic activity, market size and resource endowments would all be expected to result if not in an increased degree of specialization then at least in a different pattern of specialization.

The type of specialization considered here measures the degree to which a country's trade is specialized in certain product categories; this can be measured by the ratio of the share of the exports of a country in a given product category in total "world" exports of that product category to the share of the country's total exports in total world exports. If the ratio is greater than unity then the country is said to be specialized in the export of the product category in question. In table 8.5, footnote *a* has been used to identify those commodity categories in which the countries are specialized.

A straightforward comparison of the number of items marked *a* in the eight research-intensive categories of

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[145] The twelve countries accounted for about 80 per cent of world exports of engineering products in 1955 and about 84 per cent in 1969.

[146] Perhaps considerably less in certain countries where the government itself engages in industrial R and D on a large scale.

[147] If Switzerland is added, these three countries account for 70 per cent of pharmaceutical exports.

TABLE 8.5

Share of selected countries in the combined exports of twelve major

Export category	United States		Japan		Federal Republic of Germany		France	
	1953–1954	1965–1966	1953–1954	1965–1966	1953–1954	1965–1966	1953–1954	1965–1966
I. Total research intensive goods	57.1[a]	36.9[a]	0.9	5.4	8.9	14.0	3.5	8.2[a]
(*a*) Calculating and other office machinery (ex. typewriters)	44.7[a]	36.3[a]	0.2	1.9	12.1	16.3	8.3[a]	13.5[a]
(*b*) Telecommunications equipment exc. TV and radio receivers	48.3[a]	24.3	0.5	10.3[a]	12.8	14.8	2.6	7.3
(*c*) Electronic components (inc. valves and tubes)	40.4[a]	27.7[a]	0.5	11.4[a]	8.4	13.0	4.0	7.7[a]
(*d*) Electro-medical and X-ray app.	27.9	19.8	0.6	2.6	45.5[a]	34.1[a]	5.6	4.7
(*e*) Electrical measuring apparatus	60.4[a]	37.8[a]	1.3	6.0	9.5	22.3	3.5	7.3
(*f*) Electrical machinery and n.e.s. appliances and parts	15.0	22.5	2.3[a]	10.5[a]	23.3[a]	31.5[a]	7.0[a]	6.0
(*g*) Scientific and controlling instruments	22.9	25.3	5.1[a]	10.8[a]	27.9[a]	25.4[a]	9.7[a]	7.2
(*h*) Aircraft (inc. engines and parts)	75.5[a]	52.9[a]	—	0.5	—	3.0	1.3	7.3
II. Total investment goods	36.8	28.6[a]	1.1	4.4	19.8[a]	25.5[a]	5.6	6.6
III. Heavy transport equipment	45.2	17.8	4.5[a]	23.5[a]	10.4	16.9	6.2[a]	5.9
IV. Passenger cars and accessories	39.8	22.3	0.2	2.8	14.9	29.1[a]	7.2[a]	9.1[a]
V. Other consumer durables	21.5	10.8	3.7[a]	23.6[a]	18.0[a]	20.0	5.0	4.8
VI. Total engineering products	39.0	25.9	1.8	8.1	16.2	22.7	5.9	7.3

Source: GATT, *International Trade 1967*, Geneva 1968.

NOTE.—The twelve leading exporters of engineering products are the ten above plus Canada and Switzerland.

engineering goods among all ten countries in the 1953–1954 period and in the 1965–1966 period shows an increase from 24 to 27. In itself, this does not necessarily, however, indicate an increase in the degree of specialization, nor does it take into account negative specialization (or ratios less than unity).[148] A summary measure of specialization, that takes into account both positive and negative specialization, as well as degrees of specialization, is the standard deviation from unity of the ratios of a country's research-intensive engineering export shares to the country's share of total engineering exports in global exports of engineering goods. The standard deviation from unity may be termed an index of specialization, which is shown below for nine ECE countries and Japan, between the mid-1950s and the mid-1960s, the higher values indicating greater degrees of specialization.

Indices of specialization in research-intensive engineering product categories for selected ECE countries and Japan in 1953–1954 and 1965–1966

	1953–1954	1965–1966
United States of America	0.17	0.15
Japan	0.33	0.20
Federal Republic of Germany	0.29	0.16
France	0.17	0.12
Italy	0.44	0.13
Netherlands	1.16	0.95
Belgium-Luxembourg	0.24	0.20
United Kingdom	0.16	0.12
Sweden	0.33	0.31

Source: Calculated from table 8.5.

The figures indicate that, far from increasing over the period, specialization in the research-intensive engineering product categories distinguished has decreased in each of the ten countries considered. The United States, the United Kingdom and France started the period with the lowest degrees of specialization and these had declined further by the end of the period. The Netherlands was by far the most specialized throughout the period, but to

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[148] The ratio used to measure specialization implies that unity means no specialization and that deviations from unity, both positive and negative, indicate forms of specialization. The importance of negative specialization can be gauged from the fact that if a country has no exports in a particular commodity group within engineering it is, relative to other countries, in some sense specialized in the remaining categories of engineering products.

TABLE 8.5

exporters of engineering products, 1953–1954 and 1965–1966

Italy		*Netherlands*		*Belgium-Luxembourg*		*United Kingdom*		*Sweden*		*9 countries as percentage of 12 countries*	
1953–1954	*1965–1966*	*1953–1954*	*1965–1966*	*1953–1954*	*1965–1966*	*1953–1954*	*1965–1966*	*1953–1954*	*1965–1966*	*1953–1954*	*1965–1966*
1.7	4.9	2.7	6.6[a]	1.6	2.6	17.9	14.2	2.3	2.9	96.6	95.7
6.8[a]	9.7[a]	1.9	2.2	0.4	0.6	14.1	11.9	8.5[a]	6.1[a]	97.0	98.5
0.7	4.7	1.5	10.1[a]	4.6[a]	5.2[a]	24.1[a]	16.4[a]	4.8[a]	6.9[a]	99.9	100.0
1.4	5.1	29.7[a]	24.6[a]	1.4	2.1	13.0	7.6	1.2	0.8	100.0	100.0
1.2	3.4	2.8	20.2[a]	1.5	1.9	10.8	4.1	4.0[a]	9.2[a]	99.9	100.0
3.6[a]	4.8	2.2	5.8[a]	0.9	1.1	17.2	13.1	1.3	1.8	99.9	100.0
8.2[a]	4.0	0.7	3.8[a]	0.5	5.7[a]	37.0[a]	14.6	5.9[a]	1.4	99.9	100.0
2.3	4.1	2.6	3.5	1.0	1.4	15.4	12.1	2.4	2.2	89.3	92.0
0.6	3.0	1.5	4.3[a]	0.7	2.8	16.2	17.4[a]	0.2	0.2	96.0	91.4
2.7[a]	6.2[a]	1.7	2.6	2.2	2.7	22.8[a]	15.8[a]	2.9	3.8[a]	95.6	96.2
1.7	4.5	6.0	4.9[a]	3.7[a]	2.9	16.4	12.7	5.0[a]	8.4[a]	99.1	97.5
2.6[a]	4.7	0.5	0.6	1.2	5.8[a]	30.6[a]	16.3[a]	0.9	2.3	97.9	94.0
2.5[a]	8.9[a]	6.9[a]	5.9[a]	0.7	2.0	18.8	9.8	1.9	1.8	79.0	87.6
2.3	6.1	2.9	3.6	2.4	3.4	22.0	14.7	2.9	3.6	95.4	95.4

[a] Indicates where a country's percentage share of the twelve countries' total exports of a category exceeds its percentage share of the twelve countries' total exports of all engineering products.

a diminishing degree. In short, the figures suggest that the structure of exports in the eight research-intensive categories is tending over time towards greater uniformity within each of the countries considered. In other words, the shares of country exports in each of the eight categories of research-intensive goods are, on average, tending towards the share of the country's total engineering exports in global engineering exports. Hence the general trend over the period has not, on this measure, been toward specialization, but rather the reverse.

What explanation can be advanced to account for this possibly unexpected result? It might be suggested that competition and import-substituting policies have led countries to develop a wider range of productive capacities in the engineering industries; or that rising standards of living have effectively increased market sizes to the point where sufficient economies of scale can be achieved in national or sub-regional markets to justify increasing domestic production. A more plausible explanation, however, is that the choice of eight categories of research-intensive engineering goods has meant the use of too wide a grid to identify the increasing specialization that is taking place in production and trade in particular commodities and components. The eight categories of research-intensive engineering goods used are so broad as to conceal this detail. At this level of aggregation, diversification may be said to have characterized the period. The figures do indicate, however, that the various countries developed increasing export capacities in many of the areas of research-intensive production in which, at the beginning of the period, they had little or no export capacity.

The discussion has so far been confined to the market economies, because fully comparable data are not available for eastern Europe. In table 8.7 six categories of engineering goods have been selected so as to match as closely as possible the categories in table 8.5 for ten market economies. Czechoslovakia held the largest share (34 per cent) of the combined exports of engineering products of the six countries in 1967. The Soviet Union was second with 25 per cent and the German Democratic Republic was third with 20 per cent. This order holds for each of the five broad categories of engineering goods.

The export shares of the six countries in the total group's exports show a varied pattern across the eight categories of research-intensive goods. The Soviet Union has virtually no exports of telecommunication equipment or of electronic components, but accounts for 90 per cent of combined exports of aircraft. Similarly, exports of calculating and other office machinery are dominated

TABLE 8.7

Shares of selected CMEA countries in their combined exports of engineering products in 1967

(Percentages)

Export category	*Czechoslovakia*	*German Democratic Republic*	*Hungary*	*Poland*	*Romania*	*Soviet Union*
1. Total research intensive goods	14.1	36.9	14.0	4.4	0.5	30.1
(*a*) Calculating and other office machinery (excluding typewriters)	5.1	80.8	—	3.3	—	10.8
(*b*) Telecommunications equipment (excluding TV and radio receivers)	26.2	44.9	28.9	—	—	—
(*c*) Electronic components (including valves and tubes)	36.9	29.8	17.3	16.0	—	—
(*d*) Electro-medical and X-ray apparatus	11.0	33.2	23.2	13.5	—	19.1
(*e*) Electrical measuring apparatus	16.8	21.9	14.6	—	—	46.8
(*f*) Electrical machinery and appliances and parts n.e.s	13.1	17.6	27.2	13.1	—	29.0
(*g*) Scientific and controlling instruments	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
(*h*) Aircraft (including engines and parts)	—	2.3	1.2	4.1	2.0	90.4
2. Total investment goods	23.3	32.9	3.0	12.4	4.8	23.7
3. Heavy transport equipment	17.3	23.6	11.6	18.6	7.7	21.2
4. Passenger cars and accessories	29.3	20.3	—	4.9	—	47.0
5. Other consumer durables	29.3	23.3	19.8	7.9	—	19.7
6. Total engineering products	34.2	20.1	6.3	10.9	3.2	25.3
Specialization index	0.24	0.50	0.87	0.26	0.35	0.45

Source: ECE, *Bulletin of Statistics of World Trade in Engineering Products 1967*, New York 1969, and for Romania, *Anuarul Statistic*.

by the German Democratic Republic with 80 per cent of the total.

At first sight there appears to be more specialization among the seven categories of research-intensive products in eastern Europe than in western Europe. Export specialization indices for trade in research-intensive engineering goods have been calculated for the east European countries using the same method as described above for the western countries and are shown in the last row of table 8.7. The categories included in the calculations for the east and west are roughly similar, so that the two sets of specialization indices are comparable. On average, at this level of aggregation, the centrally planned economies show more specialization in the export of research-intensive engineering goods than the market economies. With the exception of the Netherlands, whose exports of research-intensive engineering goods are exceptionally specialized (due to the predominant position of the electronic components category) and Sweden, all the west European countries show less specialization in trade in research-intensive engineering goods than the least specialized of the east European countries. Whether this hypothesis holds at finer levels of disaggregation is a question that cannot be answered with available data.

The influence of technological change on economic development in the ECE region during the past two decades has been more pervasive—and in many respects more subtle and more imponderable—than the impression conveyed by this brief chapter. For example, national policies in respect of technical and higher education and of manpower training in general have at different times and in different countries been reformulated so as to reflect the current and anticipated requirements of accelerated technical progress. But the very speed of technological innovation, coupled with intense international competition in some research-intensive branches such as aerospace engineering, has sometimes rendered obsolescent government employment and procurement policies before their full implementation. The economic repercussions—on growth, on competitiveness, on income-distribution—of such unforeseen obsolescence have not been calculated, and may well be incalculable. Technological forecasting has attracted much attention in recent years, but this does not yet seem to have yielded any settled methodology which would significantly reduce the uncertainty that still characterizes the process of discovery and the speed and extent of its industrial application.

A related field of policy-making beset with uncertainties is that of deciding where the balance of advantage lies, and what the balance of effort should be, between national innovative effort and the international transfer of technology by commercial or co-operative channels. Viewed in a narrowly national aspect, it would *prima facie* seem most advantageous to imitate or buy licence rights relating to technology generated in countries which have an established lead in research or innovative performance. But "technological gaps" cannot always be turned to the advantage of the importing country without imposing unacceptable restrictions on direct foreign investment. There has consequently been an increasingly active search, particularly within sub-regional economic groupings, for co-operative arrangements through which both the costs and the benefits of technical progress are shared amongst a number of participating countries. From an international aspect, progress in this direction makes sense, because the present preponderance of national competitiveness frequently entails wasteful duplication of research effort, and hence lost opportunities for the inventive talent of the region as a whole. However, formidable difficulties will have to be overcome before the manifest advantages of thoroughgoing international co-operation in non-commercial fields of high-cost research (such as CERN) can be combined with the benefits derived from the numerous bilateral arrangements concluded in recent years in more commercial spheres of technological progress. This is but one of many tasks in the realm of technological policy formulation and co-operation to which ECE governments will be devoting close attention in the years to come.

CHAPTER 9

ENVIRONMENTAL POLICIES IN A CHANGING EUROPEAN LANDSCAPE

A quarter of a century of sustained expansion, carrying with it the industrializing of formerly agricultural economies, great movements of population, transforming of agricultural methods, and major technological changes in industry, energy and transport, has brought about a far more active approach to the social and physical consequences of economic growth. The consequences discussed in this chapter can be broadly described as "environmental", influencing both the material conditions of living and the need to preserve the resources of nature. None of the problems is new. But the scale on which they arise calls for a much deeper grasp of their nature and a much more radical and comprehensive strategy for the defence of man's environment.

Section (i) of the chapter sets a background. It presents in maps certain aspects of the geographical concentration of population and economic activity not only among European nations but within each of them; it is part of the background, too, for the increasing interest in policies of regional development. The rest of the chapter deals with two wings of the environmental problem. Section (ii) is concerned with the pattern of urbanization, since the city is the physical environment of most Europeans, and with some of the problems of regional and urban planning (to which reference was also made in chapter 7). Section (iii) deals with some environmental consequences of economic change, particularly with pollution and other environmental damage and with the policies being adopted to allow man to compete for space, air and water with his own artifacts. The two wings are closely linked, since much, although not all, of the loss of environmental quality arises from the fact of geographical concentration of population and industry.

(i) Aspects of the economic geography of Europe

Throughout most of this study, nations—or groups of nations—are, necessarily, the units of analysis. But for many purposes, and particularly for a discussion of the various environmental issues, a discussion in terms only of national units is particularly inadequate. The forces which create the environmental problems are in one sense much more localized; in another sense they are more diffused since they cut across national boundaries. Moreover, there are many features of the European scene for which national averages obscure the important similarities and differences.

A full analysis of regional problems within European countries cannot be attempted here. But as a background for such a discussion, and in particular for a bird's-eye view of some of the major factors which may underlie environmental policies, a number of maps have been prepared (to be found at the end of the book) based upon a division of Europe into 160 geographical units.[149] These show:

Map 1. Change in density of population 1950–1968;
Map 2. Gross domestic product per head of population 1968;
Map 3. Density of gross domestic product in 1968 (GDP per km^2);
Map 4. Share of employment in agriculture in 1968 (as per cent of total employment);
Map 5. Density of industrial employment in 1968.

The purpose of these maps is to display the geographical distribution of population and of economic activities in the different parts of Europe. A few preliminary points must, however, be made about the statistical basis, which is very far from ideal.[150]

Regional units

All the maps are based on a *uniform set of regions* used for all the characteristics described (with minor regrouping where not all data are available). Homogeneous regions might be defined based on similarity in area, or in size of population, or in various economic and social characteristics (even in principle, the problems are not simple, as all regional planners and economic geographers know). For total population and density, most countries in their population censuses provide detail in very small units—much smaller than could be displayed on maps of this size.[151] The main constraint, however, arises from the limited amount of information about the geographical distribution of gross domestic product and, although to a lesser extent, of industrial and agricultural employment.

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[149] These are selected from a larger series of maps and charts describing also other features of the European scene, and changes over time, on the same geographical basis, presented in *The ECE Region in Figures.*

[150] Here only a few main points can be emphasized about the statistical basis. For a fuller account and for the composition of the regions, see the relevant notes in *The ECE Region in Figures.*

[151] Most European countries have taken censuses around 1970. When the detailed results are available, much of the data used will need revision.

In most countries, official or unofficial estimates have been made of the geographical distribution of output or incomes.[152] The very varied size and nature of the geographical units used in these estimates have largely determined the regional boundaries used in the maps presented here. The original estimates in some cases relate to administrative units (which are themselves sometimes designed to mix together rich and poor, or agricultural and industrial areas, sometimes based on historical or political units, and sometimes aimed at homogeneity of character); in other cases, the estimates relate to areas specifically chosen by the regional analyst to link areas with similar characteristics. The general principle in this study has been to combine small units, in countries where very detailed figures are available, so as to establish a set of regions for all countries of the same rough order of magnitude in population size and suitable for exhibiting differences on a continental scale. For the most part, the aim was to choose regions with populations in the range 5–15 million. But it seemed desirable to allow units of smaller populations in small countries; and for some large countries, estimates could be made only for much larger units. The result of inequality in the nature and size of the regions is that the relative intensity of certain characteristics can be lost. Thus, large areas of high output per head or high levels of industrial employment may in fact be less significant than appears at first sight if the population is only small. So as to avoid too much emphasis on extreme values (which may depend largely on the size of unit chosen) both the top and bottom ranges of values are rather wide. The different sizes of regions are also important in creating an impression, which may be misleading, of variability between regions. In general, the larger the regions, the less the inter-regional differences.

The estimates of GDP

The regional statistics of GDP (per head or per km²) are particularly subject to reservations in addition to the heterogeneity of the regions shown.

(*a*) The national estimates relate to various concepts of production or incomes. Since the main aim is to illustrate the geographical concentration and intensity of *production* in the various regions (per head of population in Map 2 and per km² in Map 3), the most appropriate concept to use is that of added value (the contribution to total GDP) generated in the region. For several countries, this is directly shown in the national estimates (based on agricultural, industrial and enterprise censuses). For some other countries, the only data available relate to the gross value of production (or sales) or even the gross value of production of agriculture, industry and a very few other sectors; such figures have been used but carry the erroneous implication that input-output ratios are the same, in the sectors concerned, in each region. For other countries, the available information relates only to household incomes and (though not always) enterprise incomes,[153] based on tax assessments, sample household surveys, etc. In such cases it has generally (but not always) been possible to exclude non-factor incomes (social security benefits and other transfer incomes) which are not directly related to current production, and thus to approximate to the value added concept.

(*b*) For each country, the ratio of estimated GDP per head (or per km²) in each region, as just described, has been related to the national average for the same concept. Thus, a series of regional differentials is established. The next problem is to compare between countries. For this purpose, in view of the inadequacy of official exchange rates for measuring comparative levels of production, estimates of national GDPs expressed in "dollars" have been used, based on experimental calculations by the secretariat derived from an analysis of statistics in physical units of production and consumption of a range of specific goods and services.[154] (The same estimates have been used in other parts of the present study when a rough guide to relative levels of output has been needed.) No precision is claimed for these estimates, especially where countries with different economic and social systems are compared. It is recognized that large differences in production and consumption patterns, especially between countries with different economic and social systems, may be missed by this type of comparison and may introduce various forms of bias. It must be emphasized again that the results are intended as estimates of relative output, not of relative real incomes.

(*c*) The national estimates have been made for various years in the middle or late 1960s, centering on 1968. The regional differentials have been assumed to remain constant between the year to which the original data refer and 1968: indeed the trends in such differentials necessarily move only slowly, although their value in any particular year may be affected by variations in agricultural conditions, short-term economic fluctuations, etc.

The maps

The maps must be left to speak for themselves, in the light of the qualifications noted above. One general theme may, however, be suggested, linking rather impressionistically the different measures illustrated.

Map 2, showing levels of output (GDP) per head of population, displays a main massif of high output stretching from northern Italy to Britain and from central France, through Switzerland, most of Austria and parts of Czechoslovakia to the German Democratic Republic. Within this area, lies a main ridge with its axis along the Rhine. To the east, a second massif of high output rises in the Soviet Union, centred on the Moscow area. To the north, ~~a~~ third area of high output appears in Denmark and southern Norway, Sweden and Finland. Between and beyond these high-level areas (apart from rather isolated peaks) levels of output per head tend on the whole to decline with distance.

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[152] For the Common Market countries, extensive data by regions have been published by the Office Statistique des Communautés Européennes: *Statistiques Régionales* (1971).

[153] Whatever measure is used, the problem of allocating geographically the income of geographically dispersed enterprises is notorious and has been dealt with in various ways in the original sources.

[154] See *Economic Survey of Europe in 1969*, part I, chap. 4. The estimates there given for 1965 have been extrapolated to 1968 using the normal national accounting data.

What has been described as the main massif—containing essentially the longest-established industrial and urbanized concentrations in Europe—is an area of intense concentration of output (Map 3) and of industrial employment (Map 5) in relation to the land area.[155] It is in these regions, and especially along the main ridge, that the major problems of urban development and of environmental control arise. Other, and generally newer, regions of high output—in the Soviet Union and in southern Scandinavia—are characterized on the whole by significantly lower densities; problems of congestion obviously arise, especially in the metropolitan concentrations, but the low-density hinterlands tend to be more spacious. Very broadly, output per head and densities are inversely correlated with the shares of agriculture in total employment (Map 4).[156] (These comparisons, it should be remenbered, are particularly affected by the size of the regions for which the statistics are available.)

Changes in density of population over the last two decades illustrate some major aspects of recent trends (see Map 1). In the main industrial regions—in most of which densities were already very high—increases in population density have been general but rather moderate. In these regions, natural increases have generally been only moderate, but substantial immigration has played an important part.

The regions away from the industrial centres fall into two groups. In some, densities of population have changed little or even declined—for example, northern Scandinavia, Scotland, much of Ireland, parts of southern Italy, Greece (apart from Athens). The reason is mainly emigration—within or outside the country. But in several other regions away from main industrial centres, densities of population have greatly increased. Again a distinction must be made. In some of these regions of fast expansion the reason is growth through immigration, either for employment or for retirement; the movement towards the sea coasts—not only to the Spanish, French and other Mediterranean littorals but also to the Baltic and Black Sea—is particularly striking.[157] But in other expanding regions—notably parts of Turkey and around the Caspian—the fast natural increase of population is probably the main reason.[158]

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[155] Density of total population per km² (see Map 2 in *The ECE Region in Figures*) shows much the same pattern.

[156] In Map 4 it should be noted that agricultural employment includes forestry in western Europe but excludes it in the Soviet Union and most of eastern Europe, an unavoidable inconsistency which invalidates some comparisons.

[157] For the movement towards the south in the Soviet Union, see V. Perevedentsev, "Migration of the population and the utilization of labour resources", *Voprosy Ekonomiki*, Moscow 1970, No. 9 (English translation in *Problems of Economics*, International Arts and Sciences Press (IASP), New York, March 1971).

[158] There are insufficient data available to allow more than an incomplete picture of changes over time in regional output per head. Some information is given in chart 1 of *The ECE Region in Figures* (see also chart 2 on regional changes in industrial employment). In only two of the countries shown—Bulgaria and Czechoslovakia—have regional disparities in output per head been reduced significantly in the last two decades.

(ii) Urban patterns and urban planning

Patterns and trends in urban concentration differ greatly between countries in the region. In industrial western Europe, the rural-urban migration process has now slowed down (see table 9.1), and in some countries, notably the United Kingdom, has come to a halt.[159] Elsewhere there has been a strong urbanization process throughout the last 20 years; for instance, in the Soviet Union, the rural population has decreased during the last 20 years from 57 to 37 per cent. And in Turkey, where urbanization began gradually in the 1950s and gathered momentum in the 1960s, the population of Ankara grew between 1951 and 1968 from 0.5 to 1.25 million; by contrast, the population of large British metropolitan areas remained virtually stable over the same period.

Although the rate of urban migration is less of a problem in the highly industrialized western countries, most of them face problems arising from the settlement pattern which emerged during the urbanization process. In northern and western Europe, as in the United States, the population is more highly concentrated in large metropolitan areas than in eastern Europe (table 9.2), but there are significant differences between individual European countries. A distinction may be observed between two "types" of city size distribution. One is the "primate distribution", where one or a few very large metropolitan areas dominate a number of smaller towns and where there are few towns of intermediate size (e.g., Austria, Denmark, France, Greece, Hungary, the Netherlands, Portugal, Spain and Sweden); France and Hungary are particularly extreme examples of the dominance of the capital cities ("monocity" societies). The second is the "rank size distribution" where the distribution of city sizes is smoother; the size rank of a city multiplied by its population is roughly a constant for a given country (e.g. Belgium, the Federal Republic of Germany, Finland, Italy, Poland, Switzerland, the Soviet Union and the United States).[160]

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[159] See, for example, Richard L. Forstall and Victor Jones, "Selected Demographic, Economic and Governmental Aspects of the World's Major Metropolitan Areas", *Metropolitan Problems* (ed. Simon R. Miles), Toronto, Methuen 1970, pp. 63–65.

[160] The United States is an example of a country with a rank size distribution over-all, but with a very high concentration of cities within a few small areas. The pattern produces some of the same problems of congestion and ecological imbalance as a primate distribution.

TABLE 9.1

Distribution of population between rural areas and four urban size-classes, 1950 and 1970

(Percentages of total population)

Region or country	*Rural*[a]	*Urban*[b]			
		(I)	*(II)*	*(III)*	*(IV)*
Northern Europe[c]					
1950	30.5	13.3	15.5	8.7	32.1
1970	25.1	16.7	14.5	10.6	33.1
Western Europe[d]					
1950	36.8	26.3	11.2	7.5	18.1
1970	27.0	28.0	13.5	5.9	25.4
Eastern Europe[e]					
1950	57.6	25.1	6.3	3.2	6.7
1970	45.4	30.3	9.0	3.7	11.6
Soviet Union					
1950	57.5	21.6	11.1	5.1	4.7
1970	37.7	31.5	14.7	7.6	8.4
Southern Europe[f]					
1950	59.5	20.6	8.0	4.2	7.6
1970	49.3	21.1	12.7	2.7	14.2
Turkey					
1950	77.9	13.8	3.6	4.7	—
1970	68.8	12.9	5.3	2.1	10.9
United States					
1950	36.0	20.1	12.8	6.1	25.0
1970	24.8	16.9	13.3	7.5	37.6

Source: Kingsley Davis, *World Urbanization 1950–1970. Volume I: Basic Data for Cities, Countries and Regions*, Berkeley, University of California, 1969.

[a] Inter-country differences in the "rural" percentage are particularly influenced by differences in the administrative or other units on which the distinction between rural and urban areas is based.

[b] Class I: Places defined as urban but having fewer than 100,000 inhabitants; Class II: Urban agglomerations of 100,000 to 499,999 inhabitants; Class III: Urban agglomerations of 500,000 to 999,999 inhabitants; Class IV: Urban agglomerations of 1,000,000 or more inhabitants.

[c] Channel Islands, Denmark, Faroe Islands, Finland, Iceland, Ireland, Isle of Man, Norway, Sweden and the United Kingdom.

[d] Austria, Belgium, France, Federal Republic of Germany and west Berlin, Liechtenstein, Luxembourg, Monaco, the Netherlands and Switzerland.

[e] Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland and Romania.

[f] Albania, Andorra, Gibraltar, Greece, Holy See, Italy, Malta and Gozo, Portugal, San Marino, Spain and Yugoslavia.

A rank size distribution is likely to be the outcome of a variety of independent influences determining the location and size of cities within a country; a diversified industrial structure, a number of separate marketing centres, a decentralized (for example, a Federal) administrative system, tend to produce such a distribution. Thus, for each activity, there may be an optimal spatial distribution; the greater the diversity of activities, the more likely it is that their combination will produce a variety of city sizes with a more or less random distribution. By contrast, a primate distribution will arise when economic development has been dominated by a few activities or when the administration is highly centralized. The actual size distribution in any country is the result of such influences operating over a long period of time and depends also on the size of the country. It is impossible to lay down general rules about the optimal type of distribution. However, it may be noted that many countries are now pursuing policies to reduce the dominance of primate cities;[161] in particular, planning policies in the Soviet Union and several east European countries are directed towards the development of a balanced hierarchy of cities.

Similarly, planning problems arise from the pattern and density of land use within urban areas. Like the urban size distribution within a country, individual cities have been shaped historically by a variety of forces. Different urban shapes and densities all have advantages and disadvantages from economic, social and environmental view-points and it is not easy to calculate a net balance of benefits and costs. It is in any event unlikely that a single "optimal" urban pattern and form exists. Many

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[161] Brian J. L. Berry, "City Size Distribution and Economic Development", *Economic Development and Cultural Change*, 9 (1961).

TABLE 9.2

The largest urban agglomerations

(Estimates for 1970)

	Percentage of total population		
	Largest city	*Next three cities*	*Total (all four cities)*
Northern Europe			
Denmark	29.8	8.5	38.3
Finland	15.9	..	..
Ireland	26.2	..	..
Norway	15.2	10.3	25.5
Sweden	16.7	14.7	31.4
United Kingdom	20.6	13.4	34.0
Western Europe			
Austria	25.4	9.4	34.8
Belgium	11.2	14.5	25.7
France	16.9	5.5	22.4
Federal Republic of Germany and west Berlin	11.1	10.7	21.8
Italy	5.4	7.9	13.3
Netherlands	8.7	17.5	26.2
Switzerland	10.7	15.0	25.7
Eastern Europe			
Bulgaria	10.9	7.4	18.3
Czechoslovakia	7.2	6.4	13.6
German Democratic Republic	6.5	8.4	14.9
Hungary	18.6	4.6	23.2
Poland	7.3	13.3	20.6
Romania	8.6	4.2	12.8
Soviet Union	2.8	2.8	5.6
Southern Europe			
Greece	27.3	..	..
Portugal	15.4	..	..
Spain	9.1	8.7	17.8
Yugoslavia	5.6	9.1	14.7
Turkey	7.4	6.6	14.0
United States	7.8	10.1	17.9

Source: As for previous table.

The data relate, wherever possible, to the "urban agglomeration" as defined in the source. Where there are fewer than four cities exceeding 100,000 population, the proportions are given for the largest city only.

urban problems are related to the social costs of industrial land uses and most European cities now have detailed plans for achieving a more socially desirable pattern of land use. Current policies are also increasingly directed at avoiding an excessive concentration, or dispersion, of population and economic activity.

Although many factors are at work, probably one of the most important influences on urban forms is the transport system, and particularly the system predominating at the time of a city's most rapid growth. The horse, the railway, the tramway and the automobile have each produced a distinctive urban shape; and subsequent changes in transport technology have also had their impact on the shape of cities. Transport policy has slowly become a major instrument of urban design and of planning in general: transport modes (and costs) not only affect the location of activities and the economic functioning and efficiency of towns and urban areas but are also a major influence on urban form and density, on the extent of noise and environmental pollution, and on the whole complex of social and cultural behaviour patterns of urban life. Too often, however, the immediate imperatives of providing more space for vehicles has obstructed the many other needed improvements in city design.

Trends and prospects in physical planning policy

During the past twenty-five years there has been a radical change, in almost all countries, from a piecemeal approach to physical planning problems towards a system of comprehensive physical planning integrating economic, social and environmental objectives. In particular, countries have recognized the importance of policies for land-use, at the national, regional and urban levels, as instruments for achieving these objectives. However, nowhere has it yet been possible to develop fully satisfactory land allocation criteria and devices. In west European countries, traditional forms of land ownership cause great difficulties in implementing planning policies. On the other hand, in planned economies it is often difficult to find land values which correctly reflect the objectives of the planners; attempts to determine agricultural land values have been made in most of these countries, and in some—particularly in Poland—efforts are now being made to develop a comprehensive system of land values which would fit into the framework of co-ordinated government policy.

Particularly difficult problems arise in determining the proper amount and timing of rural-urban land conversion. Denmark, for example, has developed strict urban and rural zoning on a nation-wide basis, together with corresponding taxation measures to reduce speculative profits. In most west European countries, various land tax systems are being applied so as to augment the supply of land for urban development by making unprofitable the retention of vacant plots within urban zones.

In their land use policies, governments have a special interest in securing land and land reserves for infrastructure, social and cultural uses. One great problem in market economies is the increase in land values caused by government-financed improvements. Taxation of betterment values, and compensation for losses in value, have been applied, for example in the United Kingdom, but create their own problems. In several countries, most recently in the Federal Republic of Germany, provision is made for the compulsory purchase of land at its price before the improvement plans had been published. Such measures, by discouraging land speculation, may help to reduce one of the obstacles to providing the amount of information needed to promote citizen participation in the whole planning process.

Most countries have inherited some regional imbalance —overcrowding, congestion and uncontrolled urban growth in some regions, and relative pauperization and physical deterioration in others. Consequently, regional policies have been developed aimed at achieving a more balanced spatial economic development. In eastern Europe, plans provide for industrial sites in developing regions, and prevent new industries from being located in areas already congested. More desirable hierarchies (e.g. approaching the rank size distribution) of settlements are being developed—for instance, in Hungary and Romania—and increased attention is being devoted to providing modern infrastructure and service facilities in less developed regions. Similarly, in western Europe, regional programmes have been developed providing funds for infrastructure development, for manpower mobility, education and training, and for subsidizing existing or new enterprises in certain developing areas.

In spite of these policies, the desired degree of economic equality has not been achieved. The main reasons for failure lie in the external economies which industries obtain when they are located in larger agglomerations. A Swedish study has shown, for example, that investment (in industries which can operate over the whole country) necessary to produce a given output would have to be increased by nearly 20 per cent to reduce the standard deviation in value added per employed person, between regions, from 5,600 to 5,200 S. Kr. per annum.[162] Other studies have shown that transport investment in developing regions may quite well accelerate out-migration. Consequently, to preserve the economies of an urban agglomeration (especially in some countries with one or two dominant agglomerations) new growth centres of a considerable size have been developed, and planned settlement patterns grouped around them. Little is known, however, about the optimal size of growth centres. There is some evidence which shows that the average unit costs of some horizontally integrated infrastructural services increase from a certain city size onwards.[163] This does not, however, necessarily mean that large cities are economically disadvantageous since the income level also increases with city size at least up to rather high limits.[164]

But many authorities have become aware that the income level does not necessarily correspond with the quality of life; thus, the benefits and costs of regions are now being appraised from much broader angles, including ecological factors such as the waste absorptive capacity of a region, and social factors such as the facilities available for recreational, cultural and leisure activities.

This broader approach involves an assessment of social costs and benefits which are usually excluded from the economic accounts. Consequently, new regional strategies are being developed—for example, in the Nordic countries and in the United Kingdom—aimed at cultivating the beneficial economic, social and environmental characteristics of each individual region and thus providing for a broad variety of services for people with differing preferences. In this sense, the objective of reducing regional income inequality has been broadened.

City centres pose considerable planning problems: the resident population often decreases; the remaining residents are very mobile and often belong to lower income groups; accessibility tends to decline; there is a lack of parking places; streets are congested; the former variety of enterprises and services gives way to a few uses (such as offices and banks) which may require a large stock of infrastructural facilities used only during a few hours of the day. Some cities are undergoing a more or less continuous process of demolition and reconstruction, which threatens to destroy the city's former amenities and its role as a social and cultural centre. Often—particularly in smaller towns—the old city core is hardly accessible, and the blocks and structures are too small to accommodate modern service and manufacturing enterprises. Consequently, the economic vitality of the old cores may largely be diffused over the fringe areas. The presence of old structures of high cultural value aggravates the difficulties of renewal.

In the 1950s, most governments were primarily concerned with structural obsolescence and attempts were made to adjust the fabric of buildings to minimum aesthetic, sanitary and social standards. It was then discovered—and this has been particularly evident in the United States—that, in certain areas, physical redevelopment alone could tackle only the symptoms of many social problems; for example, redevelopment meant that poor people often had to move to other areas where the process of blight was then accelerated while social and cultural ties were broken. Moreover, the major problems of some buildings and areas turned out to be functional obsolescence, and it became evident that integrated plans for future land use had to be made before renewal could be started in an efficient way. Recently, attention has shifted in some countries towards the problems of environmental obsolescence: the space and infrastructure around buildings often make its current use unacceptable to its occupants and thus the major task may be environmental improvements rather than structural redevelopment. In the light of all this experience, it is clear that urban renewal is a continuing process of adapting the urban fabric to contemporary needs, a process which is inseparable from comprehensive planning at the national, regional and local levels.

In the last 25 years attention has been focused on housing policies. In the 1950s, it was mostly the need to provide a shelter for each family which led governments to influence the production and distribution of dwellings. In the 1960s, the emphasis shifted to qualitative considerations of the size, design, environment and location, related to transport networks and work places. Now, when designing residential areas, more attention is being paid to household and community activities, and to social, psychological and cultural aspects.

Planning administration and techniques

With increasing recognition of the profound and complex relationships between urbanization and economic, environmental, social and cultural patterns, and with the increasing manageability of complex systems, the content of urban and regional design practice has changed significantly. Twenty-five years ago, the European urban planner was an expansive architect, while regional thinking was largely based on rural geography or economics. More recently, nearly all countries have established a rapidly expanding network of urban and regional research institutions. Governmental planning agencies have expanded on the local, regional and national levels. In many countries, a planning profession has emerged based on a comprehensive academic education. Moreover, inter-disciplinary teams have been established comprising not only architects and planners, but also economists, social scientists, engineers, mathematicians, public health specialists, and many more.[165]

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[162] Stockholm stads generalplaneberedning, *Interregional planeringsmodell och dess effekter på Stockholmsregionen*, Stockholm 1971.

[163] See, for example, Werner Z. Hirsch, "The Supply of Urban Public Services", *Issues in Urban Economics* (ed. Harvey S. Perloff and Lowdon Wingo), Baltimore, The Johns Hopkins Press, 1968, particularly the table on page 508.

[164] William Alonso, "The Economics of Urban Size", *Papers of the Regional Science Association*, 26 (1970).

The two major decision areas confronting urban and regional planners are land use and capital investment in infrastructure. Emphasis is increasingly being laid on providing a solid scientific basis for decision making,[166] including a new interest in location theory, the use of input-output analysis on a regional basis and the development of regional multipliers to display more realistically the secondary effects of planning decisions. A number of attempts have been made to apply rational decision-making theories and principles to infrastructure investment problems (including benefit-cost and systems theory approaches).

The collection, processing and evaluation of the data needed for comprehensive planning turned out to be difficult and expensive. While data banks have now been established in many metropolitan areas, in only a few have the data been selected and processed in such a way that they can be used regularly and successfully for simulating the effects of planning decisions. Often, the data available do not meet the requirements of operational planning models and techniques. Furthermore, the application of modern planning techniques is often hampered by inflexible legal and administrative structures and traditional approaches. To encourage the development of analytical tools and methods for practical planning, many governments have promoted long-term urban and regional research strategies. Although even a reasonably solid socio-economic basis for planning decisions has not yet been developed, the scope of planning has been broadened to include the various aspects of waste management, the carrying capacity of the land from the ecological point of view, assessment of socio-cultural implications and amenity development, all of which have become priority aims. Systems of environmental and social indicators are not yet readily available, and, for many problems, the few research efforts already made do not provide a solid basis for policy. Meanwhile, decisions have to be made with a high degree of uncertainty about the costs and benefits of alternative measures. Improving the information basis in these areas seems to be a particularly appropriate field for international co-operation. Improved information would also help to make the planning problems and solutions more comprehensible and thus permit more people to participate in decisions which affect their immediate environment and their day-to-day activities.

Many prototypes of urban computer models have been developed, and these will benefit from an improved information base. So far only the simplest models, such as those for transport planning, are used in policy making. But the prediction of future trends will improve as models become more rigorous and reliable. Such models will also improve evaluation techniques and will expand the range of measurable characteristics. Any predictions of future urban development must balance two conflicting tendencies: those having a decentralizing effect on the location of activities such as automobile ownership, rising income and increased space demands per person, and the physical separation of executive and administrative functions from production, processing and service activities as seen in the research park and the suburban office complex. Against these, is a centralizing and agglomerating tendency due to the increase of urban administrative functions, the continuing need for decision-makers to maintain face-to-face contact and the development of inter-city rapid rail systems. But, another factor which could strongly affect the quality of the European landscape is becoming important: increased leisure time and the affluence to consume that time in a variety of ways. This factor, which could conflict with ecological considerations aimed at reducing the consumption of energy and resources, may not only affect existing settlement patterns and urban forms, but might even radically change basic attitudes towards physical planning and its objectives.

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[165] For a comprehensive survey of recent trends and developments in European urban design and planning, see Waclaw Ostrowski, *L'urbanisme Contemporain, Tendances Actuelles*, Centre de Recherche d'Urbanisme, Paris 1970.

[166] John R. Meyer, "Regional Economics: A Survey", *American Economic Review*, 53 (1963), pp. 19–54.

(iii) Environmental quality control—a new challenge

General background

European governments and peoples are increasingly concerned with the effects of economic growth on the quality of the physical environment and on ways of life. Pollution and other undesirable side effects of industrial and social activity are not new; they have always accompanied production and consumption at all stages of economic development. What is new is the dimension of the environmental problems which can no longer be dealt with casually or by *ad hoc* measures. The rapid growth of population and per capita production would themselves have placed great strain on environmental resources. In conjunction with changes in technology and in patterns of consumption, which have tended to increase the detrimental impact per unit of output, these developments have, in many places, led to excessive demands on the limited assimilative capacity of the natural environment.

The growing spatial concentration of the population and its activities, together with the urge for greater mobility, have constituted further important factors in the deterioration of the physical, aesthetic and cultural-social environment which is being perceived throughout the region.

There are now widespread fears that if stronger preventive action is not taken, the massive side effects of the unconsidered pursuit of economic growth may cause irreversible damage to environmental resources and, on a global scale, threaten the basic life supporting system of the earth. The need for urgent action is not simply a reaction to scientific knowledge about imminent dangers; it is also a response to social demands. Economic progress has brought about great increases in personal income and in leisure time; the value to individuals and to society of an enhanced environment has therefore been rising and is becoming the basis of an important political and economic force. The implication is that large-scale pollution and nuisances should no longer be tolerated as a necessary corollary to future improvements in living standards.

The actual problems of environmental disruption and their degree of seriousness obviously vary between and within countries, depending on a variety of geographical, topographical, demographic, economic and social factors. However, because of the pervasive character of modern production technologies and consumption patterns, certain types of environmental pollution and nuisances, to the extent that they are linked to specific economic sectors or typical geographical areas, can be regarded as common to most European countries. A large number of the products and activities which grow relatively fast with increases in income are also important sources of air, water and soil pollution and of amenity deterioration. On balance, technology has tended to become more intensive in its use of power, particularly of electricity, and there has been widespread displacement of natural raw materials by synthetic substitutes. This is true in primary production as well as in manufacturing sectors. Many problems involving a qualitative deterioration of the environment have also arisen with the development of the service sectors—for instance, the environmental disfunctions linked to transportation, such as air pollution by exhaust gases, water pollution by oil and petrol wastes, noise and congestion. Much anxiety is also felt over the effect of continuously growing urbanization on the quality of the built environment, which depends heavily on adequate water supplies and on the efficient collection, disposal and treatment of wastes. The comprehensive effects of environmental disfunctions can hardly be fully assessed when they are approached merely from a sectoral point of view; they have also to be considered in the context of limited physical areas. In numerous river basins, coastal areas, city and industrial areas, tourist and recreation spaces, it is today possible to identify various kinds of specific problems, which suggests a conflict between the man-made components and the natural elements, tending to disrupt long-established and relatively stable ecological systems. Several environmental "hot spots" are now very apparent because the threshold values for the resilience of these systems have been reached.[167]

The discussion of environmental policy problems has frequently been conducted in terms which imply a contradiction between economic growth and environmental quality control. Much of the argument is of course about measurement and the definition of statistical aggregates. But even within the conventional framework of national accounts, a change in the pattern of growth in favour of products and services with a minimal pollution effect would not necessarily lead to a lower recorded rate of growth. Moreover, new activities are likely to be stimulated by the introduction of anti-pollution measures and general environmental care. Changes in recorded GNP are not in any case intended to be taken as equivalent to changes in welfare;[168] a fall in the rate of economic growth, as conventionally measured, would therefore not necessarily mean a slowing down of the rate of improvement in living standards.[169] But a number of adjustment problems will obviously arise and changes in socio-economic values and institutions are likely to constitute part of the long-term solution. Objectives of economic growth may have to be constrained by environmental considerations, which will have a decisive influence on the pattern of economic development in the next decade.

Policies for environmental quality control

Environmental planning and management is basically a problem of how to allocate common property resources in accordance with social or collective preferences.[170] This problem, which has to be faced by market and centrally planned economies alike, involves the balancing and co-ordination of competing, and sometimes mutually exclusive, interests in environmental resources with many different potential uses and users. In economic theory, the misallocation of environmental resources has long been described by the concept of externalities.[171] In all production and consumption activities, the services provided by the environment have largely been provided free of charge to users or have been accounted for in a global way with only indirect effects on individual users. From the policy point of view, the problem consists essentially in determining how far and by what measures the social costs of pollution and nuisances generated by a given activity should or could be internalized, i.e. be borne by the enterprise or person pursuing that activity. To achieve a more appropriate allocation of scarce environmental resources it is necessary for the market or planned price systems to transmit socially correct information to producers and consumers. The reason that scarce environmental resources have been treated as free goods is that, for many of them, property rights do not exist or cannot be effectively asserted. Since a system of private property rights would be impracticable or undesirable, such resources must be regarded as public goods. At the national level, their allocation is thus a matter of government policy, whether through central planning or through market constraints. For international "commons" (for example, the high seas), the problems will have to be solved by intergovernmental agreement on a system of collective management.[172]

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[167] For a fuller discussion of related problems, see ECE *Symposium on Problems relating to Environment* (1971), Part II, chapters A and B. Hereafter this publication is simply referred to as the *ECE Symposium*. For an evaluation of the current state of knowledge regarding the fundamental causalities involved in environmental disruption, see *Man's Impact on the Global Environment*, Report of the Study of Critical Environmental Problems (SCEP), Cambridge, M.I.T. Press, 1970.

[168] The Japanese Economic Planning Agency is expected to receive a sizeable budget allocation in 1972 to develop an index to supplement GNP as the principal indicator of economic and social progress, see *International Herald Tribune*, 17 January 1972.

[169] The actual effect of environmental quality control on current national accounting aggregates depends on how related activities are recorded. Generally speaking, damage to the environment, such as pollution, is not directly recorded as a cost to be offset against the output of which it is a side-effect. Activities to remedy or prevent environmental damage, such as the cleaning of rivers, or cost of medical treatment, are recorded as a contribution to final output when they are conducted by public authorities or consumers; hence the paradoxical effect that the GNP is bigger when pollution occurs and is expensively remedied than when it does not occur at all. But the same remedial or preventive activities, when conducted by enterprises, are treated as intermediate consumption and do not enter into GNP. The resulting anomalies are substantial, even though the GNP is intended as a measure of final output of goods and services and not as a comprehensive indicator of welfare. The statistical anomalies are becoming important; in principle they could largely be resolved but the solutions would require a great deal more information about the relevant activities than is at present available.

[170] See Allen V. Kneese, "Environmental pollution, economics and policy", and *American Economic Review*, LXI (1971), pp. 153–166.

Whatever policy instruments are chosen, it should be stressed that measurement and monitoring are crucial for the control of environmental quality. However, the problems are of a very complex nature and, in many aspects, remain unsolved. Thus the most commonly available technical data refer to traditional environmental disfunctions such as air and water pollution, and it is in these areas that norms and standards have been set up, but wider coverage is desirable to render more explicit various decisions on desirable levels of environmental quality.

There is a variety of possible environmental policy approaches, but they broadly fall into two categories: one relying on regulatory authority, and the other on economic and fiscal incentives. The relative advantages and disadvantages of the two approaches will in part depend on the particular pollution problems concerned and the set of feasible technical and administrative solutions. The relative inflexibility of legal restrictions may be an advantage when ecological or social considerations demand either an outright ban on an activity, or the fixing of an absolute limit of pollution. Economic fiscal measures are generally preferred by economists on the grounds of simplicity and long-run economic efficiency. For example, a tax on the polluting activity, levied according to the volume and specific characteristics of the pollution, is not only automatic but stimulates an enterprise to minimize pollution by minimizing its tax liability; the same reduction may not be achieved by a legal regulation limiting pollution to some specified level. It is important that taxes should be introduced at the sources or the proto-sources of pollution and at a level so as to confront the individual decision-maker with the total social costs, through the price system. In this way, positive incentives can be provided, on the one hand, to the development of new, environmentally sound technology—which, in a way, is the key to sustained environmental improvement—and, on the other hand, to a shift in consumer demand towards products with lower environmental costs, while maintaining or even improving material living standards.

In practice, the two approaches mentioned above are not mutually exclusive; as experience from some countries shows, regulatory authority can well be used to establish generally valid standards and support enforcement, while pollution charges provide economic incentives to achieve those standards. In order to deal with transitional problems of economic adjustment to environmental quality requirements, it may be necessary to have recourse to tax alleviation, grants, loans, and other subsidies, but from a general policy point of view it would not be desirable to let such assistance perpetuate obsolete plant and installations.

In industrially advanced countries, and especially in areas and regions with dense economic activity, pollution-type externalities are now a rule rather than an exception. In such a situation a comprehensive environmental policy approach relying on measures which permit a high degree of decentralized decision-making may be very important for the achievement of a given improvement in environmental quality at minimum social cost. Clearly, it is impossible to eliminate all waste arising from economic and social activities; in principle, it would nevertheless be desirable to keep the generation of residuals at a minimum, and to use the absorptive capacity of the natural environment primarily for low-grade contamination processes that are technically difficult and expensive to handle by other means. This is typically a problem where specific knowledge, as well as local economic, social and ecological conditions, play a great role and the difficulty of centralizing the necessary technical information for a satisfactory solution would be enormous.[173]

Environmental management problems are not of course new to European governments—for some, they date back to the beginning of the industrial revolution. But until recently the institutional machinery has had a piece-meal character. Policy-making, administration and research have run in sectoral channels; and to the extent that adequate legislation to support intervention existed, it was often applied with latitude. Mostly, measures have been designed to treat the symptoms of environmental disruption rather than the causes, and thus have generally been of a strictly palliative nature. In recent years, awareness of a rapidly deteriorating environment has forced governments to reconsider their approaches to the entire problem. Many changes and new measures are currently being introduced, so that an assessment of the present situation is not easy. But, in very broad terms, the picture seems to be as follows:[174]

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[171] An external cost or benefit arises when an economic activity performed by one producer has an effect on some other producer or consumer who is not party to the activity. Since the external cost or benefit is not borne or received by the original producer it is not reflected in the market price of his product. An application of Marshall's concept of externalities to pollution was published as early as 1911 by Prof. A. C. Pigou in his *Wealth and Welfare.*

[172] For a rigorous analysis of the economics of environmental problems, see Robert V. Ayres and Allen V. Kneese, "Production, consumption and externalities", *American Economic Review,* LIX (1969), pp. 282–297.

[173] To meet the practical problem of deciding when pollution has occurred and by whom, one suggested proposal is to require advance deposits from producers of waste who would then bear the burden of proof to show how they had disposed of them. This is applicable in the international field also. See, William J. Baumol, *Environmental Protection, International Spillovers and Trade,* Wicksell Lectures, Almquist and Wicksell, Stockholm 1971, pp. 57–58.

(*a*) Practically everywhere, in eastern as well as western Europe, there is now a major public commitment to manage the common property resources of air and water; standards are being established, and stricter enforcement measures are being introduced. The vital importance of controlling the levels of various environmental nuisances connected with the functioning of modern industrialized societies is gradually being realized and a comprehensive approach to environmental problems is beginning to emerge.

(*b*) Governments still rely heavily on legislation for reducing levels of pollution and nuisances. Experiments with various types of taxes on effluents or emissions, in combination with prescribed standards, are still relatively recent;[175] and attempts to implement a comprehensive set of long-term incentives are rare. Subsidies are widely used; and budgetary grants to municipalities for the construction of solid waste and water treatment plants are a common and important feature in all European countries. Co-ordinated measures for environmental improvement are sometimes elaborated in connexion with regional planning projects.

(*c*) Existing patterns of administrative organization in the field of environment are extremely varied and largely reflect traditional approaches to environmental disfunctions. Responsibilities are still very much divided and a single problem—for example, water pollution—is often treated by different government departments or agencies and at different administrative levels. Recently, it has been increasingly recognized that adequate organizational and institutional arrangements constitute an important condition for the success of environmental policies, and efforts have been made to co-ordinate responsibilities at the higher decision-making and executive levels.

The following examples illustrate prevailing patterns of the administrative structures. In many countries, the co-ordinating function is vested in an inter-ministerial committee, as for example in Austria, Belgium, Bulgaria, Hungary, Ireland and Spain. A Federal Ministerial Committee serves as a co-ordinating body in Czechoslovakia and Yugoslavia. In several countries, existing ministries or new sections thereof—for example, the Ministry of Agriculture in Sweden—are assigned major competence in the field of environment. In the Soviet Union, functional responsibilities for environmental problems are still dispersed, but they are likely to be brought together under a single authority with an appropriate system of subordinate organs. In the United States, a new agency for environmental protection has been established at the federal level; and the same is true for Switzerland and the Federal Republic of Germany. In Denmark, France, Norway, and the United Kingdom, new ministries were created to deal with environmental affairs in 1971 or 1972. Some governments have also set up special boards with research and advisory functions, e.g. the Council on Environmental Quality in the United States; the Environmental Advisory Committee in Sweden; and the Pollution Control Council in Denmark. Everywhere, increasing attention is being given to such problems as the need for the adoption and integration of legal and organizational instruments to protect the environment, the creation of a proper basis for the establishment of priorities, and the elaboration of measurement and information systems.

The economic impact of environmental quality control

An evaluation of the total economic impact of environmental disfunctions and of measures to deal with them is hardly feasible at present. The traditional framework of national accounts is too narrow to include the use value of most environmental resources, either on the production or the consumption side,[176] and the input-output approach, while very promising, is at present hindered by data problems.[177] Nevertheless, it is generally held that, in order to rationalize policy decisions on measures to control environmental quality, alternatives established on the basis of social benefit-cost analysis ought to be considered. Attempts have been made in this direction but the practical difficulties are very great. Although it may be possible, on the basis of existing technology, to estimate the actual costs of attaining certain quality standards, the value of benefits will largely remain a political assessment.

Estimates of current and projected expenditures on environmental control are still fairly scarce and most existing information refers only to air and water control and solid waste management. International comparability of available data is tenuous since there are major differences in the underlying assumptions and methodology; nevertheless some estimates are given below to establish a rough idea of the scale of expenditure on environmental controls that is currently envisaged in certain countries.

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[174] For a more detailed survey of the situation at the turn of 1970–1971, see *ECE Symposium*, Part II, chaps A.3, D.10 and D.11.

[175] There has been limited use of such methods in France and some other European countries; typical examples for the United States are the tax on lead used in gasoline and the sulphur oxides charge. On a larger scale, the method has been used to control the quality of water in the Ruhr area. Application of charges, as a policy instrument, is likely to spread, as there is evidence that industrial enterprises react promptly and large social savings can be achieved.

[176] For a discussion of national accounting and environmental values see H. Schimmler's paper presented to the Twelfth General Conference of the International Association for Research in Income and Wealth, Ronneby, Sweden 1971.

[177] See A. V. Kneese, R. U. Ayres R. C. d'Arge, *Economics and the Environment: A Materials Balance Approach*, Baltimore 1970.

In the United States, the total expenditure required between 1970 and 1975 to control the major sources of pollution, in accordance with standards and target dates fixed by legislation, is estimated at about 105 billion dollars or about 1.6 per cent of the projected cumulative GNP. More than a quarter of total expenditure would be for air pollution control, more than a third for water pollution control, and the rest for solid waste management. Total annual expenditure in 1975 will be nearly twice the 1970 level (or an increase from 0.9 to 1.4 per cent of GNP).[178] According to a special enquiry, investments in air and water pollution control in 1970 by United States industry amounted to somewhat more than 3 per cent of its total expenditure on new plant and equipment; this share varied considerably between industrial branches and was as high as 10 per cent in iron and steel.[179]

In Sweden, estimates of capital expenditure on environmental quality control have been made within the framework of the national long-term study of economic development.[180] From various enquiries and sample surveys, such expenditure for 1971–1975 is estimated at 8.8 billion kroner, of which 7.2 billion will be spent by the communal authorities (25 per cent of their total planned capital expenditure) and the rest by industry (4 per cent of planned capital expenditure); total expenditure is about 1 per cent of cumulative projected GNP for the period. The share of investments for environmental purposes in total investment is projected to rise particularly rapidly in the pulp and paper industry, from around 6 per cent in 1969–1970 to around 12 per cent in 1971–1975; three-quarters of this expenditure will be for controlling water pollution. In the Federal Republic of Germany, total public spending on pollution control for 1971–1975 is estimated at some 30 billion DM;[181] more than half of this is likely to be spent on controlling water pollution and about 10 per cent on air pollution.[182]

For eastern Europe some data on expenditure on environmental control are available in the medium-term plans for 1971–1975; in general, a very sharp increase is indicated. In the Soviet Union, investments by industry (excluding electric power stations) for water pollution control amount to about 3 per cent of total capital expenditure (with higher proportions in some industries), while local authorities have assigned some 10 per cent for the same purpose. While the actual amount spent on water pollution control is planned to increase by 14 per cent in the period 1971–1975, its share in total expenditure on environmental controls is expected to remain unchanged.[183]

The above data are fragmentary and it cannot be claimed that they provide a satisfactory indication of the total resources that are being committed, now and in the near future, to environmental control. Moreover, any forecasts are bound to under-estimate the total environment-related expenditure since control devices are already embodied in many machines and processes; as environmental policies are pursued more extensively, this aspect will assume greater importance and separate projection of expenditures on environmental control will become even more hazardous.

The impact of environmental and amenity policies on the structure of output, employment and prices is difficult to assess because of the high degree of interdependence in industrial economies and the statistical difficulties of incorporating pollution and other externalities into an input-output table. Forcing enterprises to bear the external costs of their operations may of course mean that some enterprises or plants will cease operation. This may not involve unemployment or a lower industry output since the more efficient enterprises and plants which can absorb the costs of pollution control may increase their output. According to an American estimate,[184] employment in industries where charges for pollution control will be heaviest would amount to about 7 per cent of the current labour force, but only a very small fraction is employed in plants which might have to lay off workers. Moreover, economic growth need not be affected—indeed it may even be stimulated by the increased demand for anti-pollution equipment;[185] consequently, new employment opportunities should be growing elsewhere. However, the process of adjustment does carry real costs for the people directly involved; and the absence of comprehensive policies to deal with adjustment problems can constitute a major source of opposition to effective environmental policies. In considering the impact of pollution control costs on prices, it is important to take into account not only the direct effects, but also the feedback effects which occur while commodities are moving up the production chain to the ultimate consumer.[186] The incidence of the total costs for environmental quality control at the final consumer stage will very much depend on the modes of financing chosen by the national authorities. To the extent that budgetary spending predominates, the burden will fall on the taxpayer; however, a large proportion of environmental improvement costs are likely to be reflected in higher product prices and service charges—which, of course, is desirable if the aim is to secure changes in the pattern of consumption.

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[178] See *Environmental Quality*, the second annual report of the Council on Environmental Quality, Washington, D.C., August 1971, pp. 108–120. Attention is drawn to some factors which ought to be taken into account when comparing expenditure figures. For instance, the bulk of management costs for solid waste control covers collection. The timing of spending is also important: water quality standards have existed for several years, whereas air pollution standards are still being developed, and automobile emission standards will not be applicable until 1975.

[179] *Ibid.*, p. 129. In Japan, according to a sample survey conducted by the Ministry of International Trade and Industry, the share of pollution control investments in total capital expenditures by industry increased from 3.1 per cent in 1965 to 5.8 per cent in 1970. See, *On the problem of the environment and pollution in Japan*, Report by Kezai Doyukai (Japan Committee for Economic Development), September 1971.

[180] See, *Svensk ekonomi 1971–1975*, Statens Offentliga Utredningar (SOU) 1970: 71, Stockholm 1970, pp. 189–196, and Annex 8, *Miljővården i Sverige under 70-talet*, SOU 1971: 12.

[181] *Umweltprogramme der Bundesregierung*, Bonn, October 1971, Drucksache, VI/2710.

[182] *Frankfurter Allgemeine Zeitung*, 24 September 1971.

[183] *ECE Symposium*, p. 206.

[184] See, *Environmental Quality*, *op. cit.*, p. 129.

[185] The market for anti-pollution equipment in Europe has been estimated to exceed 500 million dollars, *Business Week*, 23 January 1971, p. 76. For a similar estimate for the United States, see *Fortune*, July 1970.

[186] Calculations on the basis of United States input-output tables suggest that, although price increases of all goods and services resulting from a substitution of low sulphur fuels for high sulphur fuels in industrial and domestic use would raise the average level by only a few percentage points, the impact would vary widely from industry to industry. Values as high as 10 per cent were obtained for industrial chemicals; 8 per cent for petroleum refining; and more than 6 per cent for plastics and synthetic materials. See W. Leontief and A. G. Ford, *Air pollution and the economic structure: Empirical results of input-output computation*, paper presented at the Fifth International Conference on Input/Output Techniques, Geneva 1971.

The impact of environmental policies on the volume and the pattern of international investments and world trade is uncertain. The argument that in the presence of externalities the price system will not yield an optimal allocation of resources is equally applicable to international markets.[187] In the absence of effective international agreements on policies for the control of environmental disfunctions and their effects,[188] selective restrictions on trade may have to be considered in certain cases, for instance, where an external cost generated by the exporter falls on the importer. The problem is analogous in many respects to that of non-tariff barriers to trade, such as health and safety regulations, which in international discussions have increased in relative importance since the Kennedy Round of tariff reductions In the long run, not much advantage is to be found in introducing trade restrictions intended to protect domestic producers from increases in costs due to measures for environmental control.

Fears have also been expressed that environmental policy measures in industrially advanced countries may damage the trading position of developing countries. Adjustment problems are likely to occur, but in many instances it may be in favour of the latter. For instance, a certain switch from synthetic to natural raw materials could be expected. To the extent that developing countries still have available resources in the form of the assimilative capacity of the environment, they may attract investments in highly polluting industrial activities, although benefits may be transitory. In the meantime, there is no doubt that control measures taken in countries which are leading exporters or importers of specific goods may have a decisive impact on developments at the international level.[189]

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[187] See W. J. Baumol, *Environmental protection*, op. cit.

[188] The basic issue does not seem to be so much the differences between countries in environmental control standards, as in methods of cost allocation, i.e. the extent to which control expenditures are incorporated in the prices of products and services traded.

[189] For example, referring to the British motor industry, the *Financial Times*, 20 October 1971, states that "the argument whether car exhausts do, in fact, damage health in this country (UK) or in Europe, or indeed anywhere outside the three or four American cities with identifiable problems, has become irrelevant. The necessity for every major manufacturer in the world to meet increasingly stringent American anti-contaminant regulations has produced an irreversible trend and a growing stream of legislation elsewhere".

CHAPTER 10

PROGNOSES AND POLICY OBJECTIVES FOR INTERNATIONAL CO-OPERATION

An attempt may now be made to examine some of the major trends, emerging from the analyses in earlier chapters, which bear on the future of regional co-operation and which may help to give a framework for policy action. Two prognoses are first set out, relating to trends in economic growth and in the international division of labour; three sets of objectives for policies of co-operation are then considered.

(i) A prognosis for economic growth

In the last year or so, all east European governments and many west European governments have issued economic plans or projections for the early 1970s.[190] The east European plans uniformly cover the years 1971 to 1975. The time horizons for the western countries are more diverse, some looking ahead to the 1980s; their nature and purpose varies from the very elaborate and detailed French VIth Plan (1971–1975) to summary macro-economic projections and only partly quantified statements of general policy objectives; a few (e.g. that for Denmark) are basically restricted to the development policies for public expenditure. In the United States complex studies of the future goals and potential of the economy are in progress under official auspices.

A characteristic of most of these plans and projections is that they foresee what is essentially a continuation of recent over-all growth rates, with only moderate adjustments—so far as the accompanying quantitative formulations show—to the shape and patterns of growth. There is, indeed, no special reason to doubt that the underlying trends of growth in the early and middle 1970s will continue much as in the 1960s (even though temporary fluctuations, such as the current retardation in western Europe, can still influence year-by-year results). The growth objectives, and the capacity of governments broadly to achieve them, have not altered significantly; and no special influence can now be foreseen which would at all drastically change the external environment of European economies. It may be hoped indeed, that the recently recognized need for greater flexibility of exchange rates, and a more smoothly working international monetary system, will do something to remove the recurrent pressures on domestic economic policies which have inhibited economic development. The new emphasis of policy statements on the need to improve the quality of economic growth and allocation of resources in various ways is, for the most part, reflected in the detail (and not necessarily in the published detail) rather than in the broad lines of the plans and projections. Whether this extrapolatory menu for economic growth is the best that can be devised is a question open for discussion: but it does afford the most plausible basis for a probabilistic forecast and appears to express the present intentions of governments.

This is, however, only a broad picture; it must be qualified by a number of features emerging from the plans and projections:

(*a*) In eastern Europe, growth of net material product in 1971–1975 is planned at fractionally slower rates than in the second half of the 1960s (except in Poland and Romania where significant accelerations are looked for). A rough estimate of GDP growth for the whole group, based on the plans for 1971–1975, would be of the order of a little over 6.5 per cent a year,[191] with industrial production continuing to rise faster and agriculture less than half as fast.

(*b*) In the plans for east European countries, a great deal of emphasis is placed on two features: the improvement of living standards, and the improved effectiveness of the economic system—more specifically, reducing the material and capital intensiveness of production. For the period covered by the present plans, these objectives are not expressed in any large changes in the macro-economic indicators. The shift of emphasis towards consumer goods and services is not accompanied by any large change in over-all investment ratios; on balance, changes in productivity per unit of capital stock and per person employed, at least in industry, are expected to follow recent trends. Projected over-all incremental capital-output ratios increase in most countries; relative growth rates of the major branches are not planned to change much—engineering and chemicals are planned to continue expanding much faster than the average for all industry, the light industries and food processing distinctly more slowly than the average.[192] The stability of these aggregative statistical trends does not, of course, preclude important changes in their composition; thus the wider adoption of modern techniques, notably for energy, may well involve heavy capital expenditure at the present stage. In particular, the plans stress the need for greater specialization among the member countries of the Council for Mutual Economic Assistance (CMEA); this is not, however, reflected in major changes in the trend of branch proportions.

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[190] For a synoptic and quantitative view of the prospects up to to 1980, compiled by the ECE secretariat before the present round of medium-term plans and projections was fully available, see "Structural Trends and Prospects in the European Economy", part I of the *Economic Survey of Europe in 1969* (1970). For western Europe, see also Organization for Economic Co-operation and Development (OECD) *The Growth of Output 1960–1980* (1970). For a summary of the 1971–1975 plans for eastern Europe, see *Economic Survey of Europe in 1971*, part II, chap. 3.

[191] For corresponding figures for the 1950s and 1960s see table 1.2.

(*c*) Projections for *industrial western Europe*, so far as available, [193] also indicate—for varying periods ahead—a minor slow-down in the industrial countries in growth rates of GDP from those achieved in the second half of the 1960s, but still centering on about 4.5 per cent a year. A common feature [194] is a continued increase in the investment ratio (already rising in the 1960s as compared with the 1950s).[195] Incremental capital-output ratios appear likely to rise, and capital per worker to continue increasing as strongly as in the recent past. The projections do not count on any general change in the rate of growth of labour productivity (indeed the projections for some countries imply a slower rate possibly due to expected reductions in hours of work).

(*d*) For *southern Europe*, few projections are yet available.[196] Preliminary indications suggest that the forthcoming plans for the mid-1970s will aim at least at maintaining the progressive industrialization policies and the fast growth rates—of around 6 to 7 per cent—of the 1960s.

(*e*) One central interest of the projections is the future growth of public expenditure, especially on education, health and similar services. Projections of "public consumption" (i.e direct government purchases of goods and services) in the west European plans do not show a marked increase in their share of GDP for most countries providing such projections; a more significant feature is the generally expanding share of employment—meaning mostly public employment—expected in the education and health services (although in most countries this has also been a feature of past trends). Depending on methods of financing these services, this is likely to represent further increases in the fiscal and social security charge on national incomes. The east European plans provide for the expansion of social consumption funds at least as fast as national income, and for a growing share in the economy of the service sector as a whole, and of educational, health, social and scientific services in particular.

Essentially, then, the prognosis implies for the next few years, as well as maintained growth rates, a further convergence in relative levels of income per head between the different country groups, as a result of the differential growth rates; and a further convergence in the levels of industrialization as a result of continued structural shifts. These were major tendencies underlying the temporary fluctuations of the past two decades, and the plans and projections do not suggest any substantial change of course. This rather undramatic conclusion may appear in striking contrast with much discussion of the accelerating impact of technological change on society, on the economy and on the environment; but it must be repeated that the quantitative language of economic planning may obscure changes in emphasis which are qualitatively if not statistically important.

The impact of the transformation which has occurred since the Second World War, and which is continuing, must not be under-estimated. For a century, the European economy—and much of the world economy—was dominated by a handful of highly industrialized countries. Contemporary Europe presents a completely different face—and one not seen before in history; about thirty geographically linked economies with economic structures based, or in process of becoming based, on a comprehensive range of industrial production. It is true that great differences still exist. Incomes per head (so far as efforts can be made to establish some rough measure of equivalence) vary from under $1,000 to nearly $4,000 a year. The proportions of the labour force in industry vary from 20 to nearly 50 per cent and in agriculture from over 50 to under 5 per cent.[197] These are national averages. When the statistics are further broken down into the constituent regions of each country (as is attempted in the series of maps accompanying chapter 9), the disparities between the extremes are far greater; it is also apparent that disparities between national averages hide similarities between the regions of many different countries.

Although the transformation of agrarian into industrial economies is nothing new, its rapid spread in Europe—promoted in varying degrees, most markedly in eastern Europe, by positive government action and planning—is a basic characteristic of the last quarter of a century. The development plans outlined above show that another decade will see the process of general industrialization in Europe coming close to completion.

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[192] With some exceptions: thus the growth of light industry in Hungary is expected to keep pace with that of engineering and with that of total industry.

[193] No projections are at present available for Ireland, Switzerland or United Kingdom.

[194] This is not true of the Netherlands or Sweden (where investment in housing is expected to slow down) or of Norway (where investment in shipping is projected to fall).

[195] See chap. 1 (iii).

[196] The new medium-term plan periods in southern Europe begin in years between 1971 and 1974.

[197] It should be stated that Turkey stands outside the range of figures quoted.

(ii) A prognosis for the international division of labour

Underlying this growing similarity of economic structures is the fact that industrial development no longer depends so much on the classical location factors: the presence of natural resources, easy access to established transport networks or sources of energy, or propinquity to large markets (generally, in the past, meaning old established industrial areas). The development of motor transport, of road transport and of waterways, of energy and communication networks, has vastly reduced former locational advantages. The great expansion of formal (and informal) education has familiarized people with the occupational requirements of factory production. The facilities for the diffusion of technical practice and technological knowledge (old or new), are further diminishing the privileged situation of the older industrial countries. Finally, the growing resistance to the extent of environmental damage is also likely to restrict the further expansion of some of the older industrial concentrations. All these tendencies are bound to be strengthened in future.

Within this framework, an increasing dependence on international trade can be expected.[198] This is because the spread of industrialization, contrary to some earlier expectations, has stimulated and not blocked the expansion of trade in manufactured goods. Increasing dependence means that trade in manufactures will continue to advance faster than production; this in turn implies a continued process of specialization. It is true (as shown in chapter 3), that the patterns of national production structures, in terms of the major branches for which comparable statistics are available, are becoming on the whole more similar, implying that specialization at that level is diminishing (although at the level of major branches, there is more specialization in foreign trade than in production). It was also shown (in chapter 8) that even for trade in a number of more disaggregated products which can be identified as "technology-intensive", the former concentration of exports on two or three advanced countries is diminishing. Increasingly, it then appears, European countries (together with the United States and other non-European industrial or industrializing countries) are confronting each other with the same categories of goods on the same markets—the biggest group of markets being Europe itself.

The future trend in specialization may be considered under three rather distinct aspects:

(*a*) First, there are certain industries, both old and new, where the size of the market—even of the world market—together with modern production, marketing and servicing techniques, impose rather narrow limits on the number of enterprises which can effectively operate. Obvious cases are the aerospace and computer industries, and some sectors of heavy and chemical engineering. Basically, these are industries which produce systems rather than individual products. The same sort of considerations apply to other industries where new production methods are based on continuous and co-ordinated processing of a complex of products rather than individual varieties—steel, certain chemicals and petro-chemicals and mass production of motor-vehicles may be cited. For example, the steadily increasing optimal scale of production for a complete steel complex is now considered to be of the order of 10 million tons a year—certainly larger than the prospective steel requirements of more than half the 30 countries of Europe. These are all industries where the scale of production, and the immense capital requirements, will hinder a majority of European countries from effective participation. The process of concentration and specialization is bound to continue; it may increasingly take the form, in some cases, of "international" enterprises.[199]

Within the CMEA, co-ordination of plans has progressively resulted in movements towards mutual agreement on the national locations for development of a number of specified industries and products regarded as appropriate for specialization. In the market economies, governments are unlikely to dissociate themselves from the ways in which specialization and concentration take place in these strategic industries.

(*b*) These industries, where the imperatives of large scale production impose, in one way or another, a measure of specialization, cover only a part of industry. For the remaining and larger part, the technical requirements are compatible with widespread production in medium-size enterprises. Yet here, too, it is clear that, in conditions of liberalized trading, specialization between countries is in fact occurring. Some evidence, although indirect, is found in the very large and increasing volume of trade between European countries in products of the same major branch of industry. Thus it was shown that many branches, in many countries, show both high export proportions of output and high import proportions of consumption, indicating a substantial amount of national specialization among the products of the branches concerned, especially metals, metal-using, chemicals and (but more in the west than the east) textiles and clothing (see tables 3.8 and 3.9). It was shown, too, that very large and increasing proportions of the machinery industries in some smaller industrial countries depend heavily on the import of engineering components and semi-finished products (see page 60), where it was also shown that the same applies even to several industries in the United States). The spread of this process of intra-branch specialization to trade among the less industrialized countries, and to trade between them and the more industrialized, seems to be one way in which the trading opportunities and development of the less industrialized might be promoted. Generally, it appears that a more explicit concentration of resources on specific industries in development planning, particularly but not exclusively in the less industrial countries, may have important advantages over an undifferentiated and over-extended approach to industrial expansion.[200] This is recognized in the agreement on the principles for joint planning among the CMEA members.

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[198] Several of the national medium-term projections and plans in fact envisage a certain reduction in the level of trade dependence, even—so far as it is specified—in manufactured goods. However it is a common experience that plans and forecasts of international trade are subsequently found to have substantially under-estimated the actual growth of trade.

[199] Partly because of legal and other difficulties, existing "international" corporations in the west, with production and marketing in several countries, almost all take the form of a parent company incorporated in one country only, with subsidiary companies incorporated and operating in other countries.

(*c*) These considerations are not, of course, restricted to developments within Europe. It must be expected that trade between Europe and developing countries, in particular, will slowly change its character. This trade is still predominantly an exchange of manufactured goods—especially of capital goods and industrial supplies which have largely replaced the former European exports of textiles—for primary products (for which European demand expands only slowly), metals and small amounts of manufactures, notably textiles and other light industry products. In the long run, industrialization will no doubt bring about an accelerated and more widespread expansion of developing countries' exports of manufactures and the entry of some of these countries into the expanding circle of intra-branch trade and specialization in most industrial branches. This process can certainly be speeded up, and a mutual long-term advantage secured, by co-operation in the development drive, and specifically by liberalizing of manufactured imports into the industrial countries. But it is fairly clear that until more equal levels of development are attained, the international specialization process can consist only of a further shift of bulk production in some major manufacturing branches towards the developing countries.

Neither international trade theories, nor efforts to apply them to actual situations, offer precise guidance about criteria by which to decide—even on a scientific level—which economies, in Europe or outside Europe, hold comparative advantages for the production of particular products. The process of specialization, whether promoted by deliberate planning or by historical accident, tends to create its own advantages. Hence although productivity and cost-structure comparisons throw some light, they cannot provide a satisfying basis for detailed analysis of future competitive situations. Apart from the strategic industries referred to above, in which governments are necessarily involved, increasing specialization in the west is most likely to come about through continued liberalization of trade; but it could also be promoted in a more selective way by more exchange of information about plans and intentions. In eastern Europe, the machinery and experience exist for co-ordinating development plans, often at a fairly detailed level. In both groups of countries, the promotion of industrial co-operation and of the exchange of technological information offer great opportunities for promoting a more selective specialization.

These two sets of prognoses serve as a background for considering the prospects for European policies of co-operation to meet the issues of the future.

(iii) Co-operative policies for international trade

An appraisal written in 1953[201] of the prospects for the European economy emphasize both the importance and the difficulties of reversing the process of economic disintegration in Europe which had been going on for 40 years and which seemed to be continuing in the early post-war period. The extent of this disintegration was illustrated by the very modest increases in international trade compared with the growth of the national economies. In the event the feared general development of national autarchies did not occur. But what did occur was the development of separate economic groupings within Europe and, consequently, the establishment of separate economic and trade circuits. The effect is illustrated by the fact that the internal trade of the three groupings—the EEC, the EFTA and the CMEA—amounted to 50 per cent of total intra-European trade in 1955 and increased to 58 per cent by 1969. In 1969, 60 per cent of the trade of east European countries, half the trade of the EEC members, and a quarter of the trade of EFTA members was with other members of the respective groupings (see chapter 2).

The expected enlargement of the EEC is bound to preoccupy the attention of governments and enterprises in the present and prospective member countries, and also in the countries seeking association or special trading arrangements. At the same time the Comprehensive Programme, agreed by the CMEA member countries in 1971, place great emphasis on the closer integration of east European economies.[202]

This should not, however, preclude the mutually advantageous extension of economic relations between the members of the groups. Although, as is only to be expected, trade has expanded fastest in the last decade within the newly formed EEC and EFTA, this expansion has not been simply at the expense of trade with non-member countries; the expansion of intra-group trade has been to a great extent associated with shifts of production within the groups (especially, as pointed out above, by way of intra-branch specialization) and with rapid increases in over-all import dependence. Non-members have gained increased shares of the total group markets, including domestic production as well as all imports (see chapter 2 (iii)). Within eastern Europe, the proportion of intra-trade to total trade, on the other hand, has on balance been somewhat reduced, and the ratio of trade with non-members to total output has considerably increased.[203] Thus, the expansion of east-west European trade, at over 9 per cent a year in volume from 1955 to 1969, has kept pace with the growth of total intra-European trade.

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[200] It may be observed that concentration of effort on a few product groups appears to be one important reason for the success of the export expansion of Japanese industry.

[201] *Economic Survey of Europe since the War* (E/ECE/157) 1953, especially chapter 12.

[202] Council of Mutual Economic Assistance "Comprehensive Programme for the further extension and improvement of co-operation and the development of socialist economic integration by the CMEA member countries" (Moscow 1971).

These facts are modestly encouraging for the prospects of strengthening the links between the separate circuits of European trade. But the conditions in which they occurred must be kept in mind. In western Europe, the important fact is that the formation of the preferential groupings occurred simultaneously with the general reduction of trade barriers—of which the effects will continue for a time as the Kennedy Round tariff reductions come into full effect. The expansion of east-west European trade has been the subject of continuous efforts, in which the ECE has played a major part.[204] However, the risk remains that the expansion of European trade will turn towards more highly compartmentalized patterns. It can be avoided only by reinforcing positive efforts to open up all potential channels for closer economic relationships. This must include the promotion of the various forms of industrial co-operation as well as the exchange of goods in the normal trade channels.

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[203] See tables 2.1 and 2.2.

[204] For a more detailed exposition of the kinds of action required, see ECE, *Analytical report on the state of intra-European trade* (1970) (E/ECE/761/Rev. 1).

(iv) Some basic needs of the European economy

Outside the realm of trade negotiations and of industrial specialization policies, all of which touch deeply on the competitive situations of ECE countries, there are a number of areas where the general benefits to be gained from region-wide co-operation call for reinforcing the formulation and execution of common policies. The possibilities arise in what may broadly be described as the creation of an economic infrastructure for providing some basic needs of the regional economy.

(*a*) One area of concern is *transport*, where particularly large benefits can be got from the deeper integration of systems. The technology of transport (as described in chapter 7) is undergoing a series of rapid—and extremely expensive—changes: principally the development of multi-modal systems requiring not only much new carrying equipment but also the transformation of terminals, the development of pipe-lines and the reconstruction and creation of new waterway links. Meanwhile the process of motorization, which has transformed most of western Europe in the last two decades, is now developing in eastern Europe where other priorities had hitherto delayed it; the impact on urban planning and on social conditions, as well as on the transport system itself, need not be dwelt upon. These new developments are occurring while the interdependence of national economies, and the international movements of people, are continuously growing; indeed it is partly the expansion of international traffic that has called into being the new transport technologies. The implication is that the introduction of the new methods must be planned with emphasis on the creation of international rather than purely national systems; it has ceased to be useful to regard the international functions of national transport systems as peripheral. Co-operation in transport development thus calls for intensified collaboration in the planning of investment, in the standardization of equipment, and in the harmonization of regulations and régimes.

(*b*) The second area that may be considered here is the development of *energy* supplies and usage. Recent years have seen the creation of what is described (in chapter 6) as two different and hardly interconnected energy circuits in Europe: a west European circuit based half on oil and consequently now relying for half of total energy supplies on imports from outside Europe; and an east European circuit (apart from the Soviet Union) still mainly dependent on coal and linked closely with the Soviet Union's resources in oil and natural gas. In both areas, it is to be expected that for a decade at least the growth of energy demand will be met mainly by oil and natural gas. At the same time, the trend towards the use of a greater share of primary fuels in the form of electricity will continue, requiring perhaps a tripling of installed capacity.

Beyond say the mid-1980s, substantial shifts in the trends are probable, although their nature cannot be foreseen. There are several big uncertainties. One is the uncertainty whether the rate of discovery of new reserves, particularly of oil and gas, will keep pace with the present rate of increase in demand, especially in view of the expanding use of electricity with its heavy losses in the conversion of primary fuels into useful energy. Some current estimates of possible reserves of primary fuels, other than coal, suggests serious strains by the year 2000. Another is the uncertainty surrounding the sufficiently rapid development of nuclear energy, and particularly of breeder reactors with their vastly greater potential efficiency of fuel usage. These, and many other unknowns, concern of course not only the European energy pattern but that of the world as a whole (Europe at present accounts for 40 per cent of world consumption of primary fuels and the ECE region, including the United States, for nearly three-quarters).

The scope for forward-looking international co-operation is wide. There is the urgent need for collaboration in scientific and technological research and application; areas of "big science" are involved which are already recognized to go far beyond the possibilities of the resources, financial or scientific, of individual European nations. There is the need to consider the possibilities of looking ahead for opportunities of far more interconnection between national power systems, both in east and west Europe, and between the two circuits. Further, it seems likely that pressures will arise on all primary sources of energy available in Europe other than coal; these pressures may open new channels of trade between the countries with large reserves, notably the Soviet Union, and the rest of Europe, but the pressures can be met only after big investments have been made in the necessary infrastructure and transport facilities, as well as in the actual extraction. The big problems of the energy economy are long-term problems and their solutions are necessarily solutions with a long-term period of gestation.

(*c*) It is convenient to consider here, too, some of the problems of European *agriculture and forest products*. The general agricultural policy problem (outlined in chapter 4) is far too complex to sum up in a few lines. However, one important aspect of it may be represented as basically a policy dilemma. On the one hand stands the economic need for drastic structural change and modernization of methods of agricultural production, to reduce costs to consumers, to raise the living standards of farmers and to reduce the barriers to international trade flows caused by agricultural support and protection. On the other hand, although the number of people dependent on agriculture is almost everywhere falling, the rate of decline, depending largely on the general development of economies, is not fast enough in many countries to allow the full exploitation of the most modern production methods without running the risk of more unemployment or under-employment. With the most efficient methods it should be possible for almost any European country to feed itself (if that is thought desirable) with well under one in ten of its working population in agriculture; there are only a few industrial countries where the proportion has so far sunk to this level, but in most countries of industrial western Europe, and also in the more fully industrialized east European countries, the proportion will, on present trends, be down to around one-tenth or less within a decade. Elsewhere in Europe, much larger proportions are likely to hold for many years. This dilemma, involving the general pattern or rate of economic development and not simply agricultural technology, is likely to confront policy-makers for some time yet. Its consequences, intensified by the pressures for agricultural support—and also, in many countries, for the greater use of agricultural resources for import-saving—are seen in potential and actual surpluses. At the same time, the biological and general ecological consequences of some more intensive and concentrated production practices are becoming serious.

Possibly national interests in the support of domestic agriculture run too deep for more than a gradual development of international collaboration to be possible. But it is becoming recognized that, even within this context, the confrontation of national long-term strategies and production programmes, and their mutual modification in the general interest, is required to smooth the inevitable adjustment process; to open up possibilities for trade especially for the exports of countries most dependent on agricultural production; and to reduce the costs of national agricultural supports which bear not only on consumers in the country concerned but can have a widespread international impact on prices and markets. And these problems of the developed countries must be viewed against the need for wider co-operation in resolving the much deeper issues of insufficient food production in the developing world.

The problems of *forestry and forest products* (expounded in chapter 5) are somewhat different. European demand for wood, contrary to experience in the first half of the century, has been increasing very steadily (at about 3 per cent a year) mainly because of the rapid development of its use for paper and other wood-pulp products and in the form of wood-based panels (gaining rapidly on its use in the form of sawnwood). This trend is bound to spread from western Europe, where it has been strongest, to eastern Europe and the Soviet Union. The expansion of demand called for, and was met by, a general application of more dynamic forest policies and a fuller use of available resources, despite early post-war fears of shortage.

For another decade, the continuation of recent trends in wood supply and demand is not likely to present critical problems. But the characteristic of forest economy is the long-term forecasting and planning which it requires. The continued growth of demand may, it is thought, impose strains on the existing pattern of supply during the last two decades of the century. For Europe excluding the Soviet Union, the main feature of rough projections for the year 2000 is a possible deficit in total industrial forest products, even allowing for further improvements in forest management. The area's net deficit might indeed rise from about 12 per cent of consumption in 1970 to between 20 and 30 per cent by the year 2000. This implies a potential increase in the demand from other sources including the Soviet Union; formidable reserves exist in Siberia—estimated to account for about a quarter of the world's wood resources—where a dynamic programme of development was initiated in the 1950s; full exploitation (as for the exploitation of Siberian fuel resources) will however require large-scale development of transport and industrial infrastructure.

Collaboration among producers, taking the form both of exchange of information on production methods and of long-term assessments of the supply/demand situation, has proved its value in the adaptation of forest policy to rising demand in the past two decades. Its reinforcement in the future is needed to promote the long-term adjustments which it is not too soon to plan now.

(v) New objectives for economic and social progress

Earlier sections of this chapter have been concerned with the basic needs and proportions of the economic structure. Other and wider areas of policy, and new social objectives, now urgently demand a greater degree of international co-operation. Only some of these are discussed here. But they illustrate the need, which is everywhere felt, for the more consistent integration of policy action to meet the diversity of social needs.

(*a*) Growing awareness of the wide range of dangers and opportunities, generally grouped under the heading of *environmental* problems, is now compelling new appraisals of the pattern of economic, technological and social change. The issues are discussed here under two aspects. The first wing (discussed in chapter 9 (ii)) is the pattern of *urbanization*; for the physical environment of most people in the ECE region, for most of the time, is the city—homes, workplaces and streets. Concepts and practice in urban planning have immensely developed in the past quarter of a century, moving in particular towards a much closer integration of economic, social and environmental objectives; the administrative instruments for achieving the various objectives, concerned especially with the allocation of land-use, although not yet adequate, have improved in effectiveness. Many basic issues, however, remain open and controversial. There are no generally agreed principles to determine urban designs, or the balance between towns of different sizes or, more troublesome still, the ways in which the growth of motorized transport, which has tended to dominate urban planning in the west, can be adapted to the needs for open space, quiet and safety (as well as for speedy movement).

Closely related to these questions is that of regional balance within national economies. In these subjects, there is great diversity both of ideas and of experience; willingness to make use of the experience of other countries can do much to promote progress in areas of concern which touch deeply the conditions of day-to-day life.

The second wing of the environmental issue discussed here (chapter 9 (iii)) is basically the *pollution* of air and water—essentially the problem of controlling the disposal of waste—but stretches into the nuisances of excessive noise and congestion and the destruction of natural amenities. The problems arise in large part from the geographical concentration of people and economic activities, and as unsought and largely unforeseen consequences of economic development and technological change. The regional maps of Europe (described in chapter 9 (i)), illustrating some features of these concentrations, are a first guide to the geographical concentrations of some of these environmental problems—only a first guide, because not all industries or economic activities are equally polluting and because less concentrated activities, such as some agricultural techniques or woodpulp and paper mills, also create dangerous pollution. It is, however, hardly necessary to point out that a broad, if not precisely measurable, association exists between the level and intensity of production on the one hand and the amount of environmental damage on the other.

These issues call for international co-operation: partly because some forms of pollution do not recognize national frontiers; partly because action taken to deal with pollution, which can be expensive (although not wildly so, as the figures on p. 123 show), has its impact on the international competitiveness of national economies; partly because standards are being established which must affect international trade. Perhaps more important, however, is the urgent need felt in all countries for guidance in devising adequate methods for minimizing environmental damage. Many common problems on both the technological and economic fronts are involved: adequate methods of locating and measuring different forms of pollution and the damage they do; research into technical methods of preventing, reabsorbing, or making use of residual wastes; the relative effectiveness and desirability of different fiscal and administrative ways of discouraging, or reconverting more or less drastically, pollution-creating activities. Like the other environmental problems of urban and regional planning (and many others discussed in this study), the present uncertain and inadequately informed state of policy calls insistently for the international pooling of ideas and experience. The ECE region includes most parts of the world where the serious problems arise. It should be capable of producing practical solutions.

(*b*) The second group of issues to be dealt with here are those arising from the impact of developing *technology* and from the increasing interest in technological policies (see chapter 8). The rapid and widespread increase in resources devoted to technical progress represents substantial investments in equipment, in education, and in qualified people. The resources involved in Research and Development alone—an inadequate measure of total resources involved—represent the employment in Europe of well over a million qualified engineers and scientists and the expenditure, on average, of around 2 per cent of GNP; the growth rate of this expenditure in most European countries has recently been between 10 and 20 per cent a year (see table 8.1).

How far technical progress has contributed to economic expansion is an unresolved question. More important, perhaps, is the impact that new technologies are beginning to have on methods of work and production. Many observers see a qualitative transformation in a sense comparable with, and superseding, the industrial revolution of the 19th century:[205] the simplification and consequent monotony of the division of labour entailed by the mechanical innovations of the industrial revolution (only intensified by the mass production methods of the early 20th century) is yielding to the far more complex processes of automation by computers and systems engineering. This change is already beginning to have its impact on the mix of human skills and capacities required in an advanced economy, in management as well as in operations. It may affect, too, the balance within enterprises between managerial and operational functions, opening new possibilities for industrial relations and for wider participation in the direction of enterprise policies. It will call not only for a continuation of the striking increase in secondary and higher education already witnessed in the last quarter of a century but also for extensive and continuous retraining and for a system of assessment, involving elements of technological forecasting, of the changing need for specialist skills and of the social impact of technological change. It is an open question how far and how quickly this transformation will extend beyond the minority of "big science" industries. But it offers opportunities for the ultimate disappearance of much of the laborious and repetitive work now associated with an industrial economy.

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[205] See, for example, R. Richta and a research team, *Civilization at the crossroads*, International Arts and Science Press (IASP), New York 1969.

As already suggested, there are areas of economic activity and of technology—representing a much larger proportion of technological than of economic resources—where the requirements of scale are bound to impose (except with great duplication of effort) a substantial degree of specialization and concentration. The need for collaboration and confrontation of strategies is just as great in the allocation of technological resources as in that of industrial capacity; largely, indeed, the two must march together.

Less involved with the dramatic innovations of modern applied science is the need for the wider diffusion of the technologies required for the efficient development of the broad range of industrial production, agriculture and transport—in effect, the progressive closing of what are described as "technological gaps" between the less and the more industrialized economies. (The problem exists, of course, within national economies as well as between them.) The issues here concern the diffusion of information about techniques, including the adaptation of management to make effective use of available information; the development of, in some cases, techniques particularly appropriate to the conditions of less industrialized countries, where enterprises are small-scale, capital often expensive, and labour not trained to more complex methods; the legal and administrative arrangements for commercial or co-operative transfer of patent and licence rights; the conditions in which industrial co-operation and joint venture agreements, or direct foreign investment, can best be promoted. These are all areas where international co-operation and the harmonization of policies need to be strengthened. Moreover, the dangerous spreading of pollution and environmental damage, accompanying the continuance of economic and technical advance along many existing lines, is itself a challenge to the resources of technology and to technological policy. It calls urgently for a re-direction of these resources, as well as of economic incentives, towards less wasteful ways of making use of the non-renewable natural resources of the earth.

It has become clear that up to a certain point the needs for technological progress can be foreseen and its course can be directed. Both at the national and international level, the need is to determine technological priorities with a much more comprehensive view, and much more detailed knowledge, of the implications of the present patterns of economic development and of the requirements of the future.

(*c*) Another area (in which the ECE has recently become more active)[206] is the formulation and execution of a broad range of *social policies*. These are concerned with the improvement of services related to the family, housing, health, education, old age and social security generally. They bear on incomes and work conditions, and on provision for cultural activities and leisure. To a varying extent, these policies imply the extension of collective provision of goods and services. In this area, too, falls the increasing interest in understanding the sources of demographic change. The essential feature is the integration of general economic development with the objectives of social policy; the background is the tendency felt hitherto for the formulation of social policies to be regarded as geared to economic policy (and often to each other) only through the cash nexus of the State Budget. There is increasing recognition, evident for example in many plans and projections for the 1970s, of the great importance of integrated social policies embodying a clear vision of priorities. The scope for international co-operation lies at present chiefly in the exchange of experience and ideas. The very diversity of experience and practice among ECE countries may prove particularly valuable in promoting a wider approach to these questions.

The areas in which the extension of region-wide economic co-operation can be profitable are by no means confined to those mentioned above. A number of others, many of which have been referred to in earlier chapters and which have been prominent in the work of ECE, should be briefly recalled. They include the exchange of technical and economic experience of production methods in a variety of manufacturing industries, notably steel, chemicals and engineering, and in construction and the study of supply/demand prospects for energy and basic materials. They include the promotion of international standardization or harmonization of specifications for selected products; and also the standardizing and simplifying of some of the diverse methods required for documenting international commercial transactions.

In a different area, of importance to general policy makers and policy advisers, is the promotion of joint discussion of the techniques used in the formulation of economic plans and policies and of the economic projections which form the background for policy. This has long been a feature of ECE activities. Related to it is the fruitful co-operation in the standardizing of economic statistics, which is absolutely vital to any serious attempt to compare, and to learn from, economic experience of different countries. Some of the analyses in earlier chapters demonstrate how much remains to be done in this field, but also how much progress has been made. The development of systematic and comparable statistics needs to be extended into new areas, particularly of environmental issues, technology and social affairs, where many of the basic quantities required for the well-informed consideration of policy are now lacking.

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[206] Studies of social planning have recently been launched under the auspices of the Senior Economic Advisers to ECE Governments. The ECE's long-continued work on housing and town planning has always involved the study of social policies in these fields of interest.

One general conclusion, not just from this study but from the actual development of international activities, is that policies cannot now be compartmentalized. Industrial and agricultural development, commercial policies, and the supply of basic materials and fuels are obviously inter-linked. The relatively new feature is the emerging perception of the need to conceive these aspects of economic policy as parts of a wider whole in which, in particular, the preservation of the environment, the direction of technological change and the improvement of social policies must take high places in a hierarchy of social needs. To meet these broader concepts of the pattern of social progress presents a new challenge, and formidable difficulties, for those who have the responsibility of creating integrated policies.

Experience reveals the great diversity of modes of international co-operation which have been tested and found helpful. One mode is the formal agreement on specific standards and procedures, to be absorbed into national legislation and practice. Another is the pragmatic study of existing obstacles to international transactions and of the ways in which national policies might be adapted to remove them. Another is the joint study and discussion on a scientific level of the problems involved in the formulation of policy. Another is the exchange and discussion of information, also on a technical level, of production and trading methods. Still another is the confrontation of prognoses and national policies while they are in a formative stage with the purpose of providing national policy makers with a more comprehensive and better-informed view of the external environment in which national policies will operate. All these modes of co-operative activity rest on a foundation of objective study and research to bring to light the ways in which action-directed co-operation can be fruitful.

Two final points may be made. First, the assumption underlying practical co-operation is that each country has something to learn for the future from the plans and experience of others, as well as something to give from its own. This is particularly significant in the rather exceptional circumstances of the ECE, which brings together representatives of countries with very different economic and social systems. The benefits of co-operation are not confined to the like-minded. Second, it must be recognized that the influence on national policy and national practice of joint discussion and exchange of experience is very largely an unseen influence and cannot always be demonstrated as easily as it is, for example, in the conversion of road signs to a standard design. The test of co-operation is to be sought in the steady improvement of living standards throughout the region and in the widening and deepening not only of economic relations but also of the mutual understanding of the varied economic and social systems and ways of life.

CODE OF REGIONS

CODE DES REGIONS

КОД РАЙОНОВ

Code Code Код	Population (millions) Population (millions) Население в млн.	Regions	Régions	Районы
	(1968)	**Austria**	**Autriche**	**Австрия**
a	2.57	North	Nord	Северная часть
b	1.64	Vienna area	Zone de Vienne	Область г. Вены
c	0.77	South–West	Sud–ouest	Юго-Западная часть
d	2.36	South–East	Sud–est	Юго-Восточная часть
	(1968)	**Belgium**	**Belgique**	**Бельгия**
a	4.91	North	Nord	Северная часть
b	1.54	Brussels region	Région de Bruxelles	Область г. Брюсселя
c	3.18	South	Sud	Южная часть
	(1969)	**Bulgaria**	**Bulgarie**	**Болгария**
a	1.29	North–West	Nord–ouest	Северо-Западная часть
b	2.35	Centre	Centre	Средняя часть
c	0.80	North–East	Nord–est	Северо-Восточная часть
d	1.25	East	Est	Восточная часть
e	1.46	Sofia region	Région de Sofia	Область г. Софии
f	1.28	South–West	Sud–ouest	Юго-Западная часть
	(1968)	**Czechoslovakia**	**Tchécoslovaquie**	**Чехословакия**
a	4.11	North Czech SR	Nord de la RS tchèque	Северная часть Ческой СР
b	3.46	South Czech SR	Sud de la RS tchèque	Южная часть Ческой СР
c	2.31	Central Czech SR	Centre de la RS tchèque	Средняя часть Ческой СР
d	3.26	West–Central Slovak SR	Centre–ouest de la RS slovaque	Западная и средняя части Словацкой СР
e	1.22	Eastern Slovak SR	Est de la RS slovaque	Восточная часть Словацкой СР
	(1968)	**Denmark**	**Danemark**	**Дания**
a	1.35	Northern, Western and Southern Jutland	Nord, ouest et sud du Jutland	Северная, Западная и Южная части Ютландского полуострова
b	1.81	Eastern Jutland and eastern islands, excluding Copenhagen area	Est du Jutland et îles de l'est, zone de Copenhague exclue	Восточная часть Ютландского полуострова и восточные острова, исключая область г. Копенгагена
c	1.70	Copenhagen area	Zone de Copenhague	Область г. Копенгагена
	(1968)	**Federal Republic of Germany**	**République fédérale d'Allemagne**	**Федеративная Республика Германии**
a	4.35	Schleswig–Holstein and Hamburg	Schleswig–Holstein et Hambourg	Шлезвиг-Гольштейн и Гамбург
b	7.79	Lower Saxony and Bremen	Basse–Saxe et Brême	Нижняя Саксония и Бремен
c	11.31	North Rhine–Westphalia, excluding Dusseldorf	Rhénanie du Nord–Westphalie, sauf Dusseldorf	Северный Рейн-Вестфалия, исключая область г. Дюссельдорфа
d	5.64	Dusseldorf	Dusseldorf	Область г. Дюссельдорфа
e	5.33	Hesse	Hesse	Гессен
f	3.64	Rhineland–Palatinate	Rhénanie–Palatinat	Рейнланд-Пфальц
g	8.71	Baden–Württemberg	Bade–Wurtemberg	Баден - Вюртемберг
h	10.41	Bavaria	Bavière	Бавария
i	1.13	Saar	Sarre	Саар
	(1968)	**Finland**	**Finlande**	**Финляндия**
a	2.02	Centre and North	Centre et nord	Средняя и северная части
b	1.67	South, excluding Uusimaa	Sud, sauf Uusimaa	Южная часть, исключая область Усима
c	1.00	Uusimaa	Uusimaa	Область Усима
	(1968)	**France**	**France**	**Франция**
a	3.83	North	Nord	Северная часть
b	9.38	Parisian region	Région parisienne	Парижский район
c	6.57	West	Ouest	Западная часть
d	9.19	Parisian basin	Bassin parisien	Область г. Парижа
e	4.70	East	Est	Восточная часть
f	5.39	South–West	Sud–ouest	Юго-Западная часть
g	5.78	Centre–East	Centre–est	Средне-Восточная часть
h	5.26	Mediterranean region	Méditerranée	Средиземный район
	(1968)	**German Democratic Republic**	**République démocratique allemande**	**Германская Демократическая Республика**
a	2.09	North	Nord	Северная часть
b	5.06	Centre	Centre	Средняя часть
c	4.48	South–West	Sud-ouest	Юго-Западная часть
d	5.46	South–East	Sud–est	Юго-Восточная часть
	(1971)	**Greece**	**Grèce**	**Греция**
a	5.15	Continent, Euboea, Peloponnesus, excluding Greater Athens	Continent, Eubée, Péloponnèse, à l'exclusion du Grand Athènes	Материк, Эвбея, Пелопоннес,за исключением Больших Афин
b	2.53	Greater Athens	Grand Athènes	Большие Афины
c	1.06	Other islands	Autres îles	Другие острова

Code Code Код	Population (millions) Population (millions) Население в млн.	Regions	Régions	Районы
	(1968)	Hungary	Hongrie	Венгрия
a	3.15	North–West	Nord–ouest	Северо-Западная часть
b	2.86	Budapest region	Région de Budapest	Область г. Будапешта
c	4.23	South–East	Sud-est	Юго-Восточная часть
	(1966)	Ireland	Irlande	Ирландия
a	0.21	Ulster (part of)	Ulster (partie)	Ольстер (часть)
b	0.40	Connacht	Connacht	Коннот
c	0.62	Leinster, excluding Dublin County	Leinster, sauf le comté de Dublin	Ленстер, за исключением области г. Дублина
d	0.80	Dublin County	Comté de Dublin	Область г. Дублина
e	0.86	Munster	Munster	Манстер
	(1968)	Italy	Italie	Италия
a	6.29	North–West	Nord–ouest	Северо-Западная часть
b	8.23	Lombardy	Lombardie	Ломбардия
c	9.93	North–East	Nord–est	Северо-Восточная часть
d	7.30	Centre, excluding Rome province	Centre, sauf la province de Rome	Средняя часть, за исключением Римской провинции
e	2.84	Rome province	Province de Rome	Провинция Рима
f	14.21	South, excluding Campania, including Sicily and Sardinia	Sud, y compris Sicile et Sardaigne, Campanie exclue	Южная часть, включая Сицилию и Сардинию, за исключением Кампании
g	5.13	Campania	Campanie	Кампания
	(1968)	Netherlands	Pays–Bas	Нидерланды
a	1.39	North	Nord	Северная часть
b	5.96	West	Ouest	Западная часть
c	2.39	East	Est	Восточная часть
d	3.05	South	Sud	Южная часть
	(1968)	Norway	Norvège	Норвегия
a	0.46	North	Nord	Северная часть
b	0.35	Trondheim region	Région de Trondheim	Район Тронхейм
c	0.95	West	Ouest	Западная часть
d	1.39	East, excluding Oslo	Est, sauf Oslo	Восточная часть, исключая область г. Осло
e	0.49	Oslo	Oslo	Область г. Осло
f	0.20	South	Sud	Южная часть
	(1968)	Poland	Pologne	Польша
a	3.11	North	Nord	Северная часть
b	2.17	North–East	Nord–est	Северо-Восточная часть
c	5.40	West–Centre	Centre–ouest	Западно-Средняя часть
d	8.16	Centre	Centre	Средняя часть
e	3.69	South–East	Sud–est	Юго-Восточная часть
f	3.53	South–West	Sud–ouest	Юго-Западная часть
g	6.36	South	Sud	Южная часть
	(1968)	Portugal	Portugal	Португалия
a	2.88	North	Nord	Северная часть
b	3.01	Centre, excluding Santarén	Centre, sauf Santaren	Средняя часть, включая округ Сантарен
c	2.00	Lisbon area (Lisbon–Setúbal)	Zone de Lisbonne (Lisbonne–Setubal)	Область г. Лиссабона (Лиссабон - Сетубал)
d	1.00	South	Sud	Южная часть
	(1968)	Romania	Roumanie	Румыния
a	4.81	Centre	Centre	Средняя часть
b	4.13	North–East	Nord–est	Северо-Восточная часть
c	2.07	West	Ouest	Западная часть
d	2.20	South	Sud	Южная часть
e	6.50	South–East	Sud–est	Юго-Восточная часть
	(1968)	Spain	Espagne	Испания
a	3.68	Cantabrian Coast	Côte cantabrique	Кантабрийское побережье
b	8.32	Centre, excluding Madrid area	Centre, sauf la zone de Madrid	Средняя часть, исключая провинцию г. Мадрида
c	3.46	Madrid area	Zone de Madrid	Провинция г. Мадрида
d	8.08	Eastern coast and Balearic Islands	Côte orientale et îles Baléares	Восточное побережье и Балеарские острова
e	8.30	South	Sud	Южная часть

CODE OF REGIONS
(continued)

CODE DES REGIONS
(suite)

КОД РАЙОНОВ
(продолжение)

Code Code Код	Population (millions) Population (millions) Население в млн.	Regions	Régions	Районы
	(1968)	**Sweden**	**Suède**	**Швеция**
a	1.76	North	Nord	Северная часть
b	1.34	East–Centre	Centre-est	Восточно-Средняя часть
c	1.44	Stockholm area	Zone de Stokholm	Область г. Стокгольма
d	1.53	West	Ouest	Западная часть
e	0.76	Småland, Öland, Gotland	Småland, Öland, Gotland	Смоланд, Эланд, Готланд
f	1.11	South	Sud	Южная часть
	(1968)	**Switzerland**	**Suisse**	**Швейцария**
a	1.08	Canton of Zurich	Canton de Zurich	Кантон Цюрих
b	3.99	West and North, excluding Canton of Zurich	Ouest et nord, sauf canton de Zurich	Западная и Северная часть, исключая кантон Цюрих
c	1.07	South, Centre, East	Sud, centre et est	Южная, Средняя и Восточная части
	(1965)	**Turkey**	**Turquie**	**Турция**
a	5.84	Thrace, Marmara and Aegen coasts, excluding Istambul area	Thrace, côtes des mers de Marmara et Egée, sauf zone d'Istamboul	Фракия, побережье Мраморного и Эгейского морей, исключая область г. Стамбул
b	2.29	Istambul area	Zone d'Istamboul	Область г. Стамбул
c	4.96	Black–Sea coast	Côte de la Mer noire	Черноморское побережье
d	2.57	West Anatolia	Anatolie occidentale	Западная Анатолия
e	7.88	Central Anatolia	Anatolie centrale	Средняя Анатолия
f	4.07	East Anatolia	Anatolie orientale	Восточная Анатолия
g	1.36	South–East Anatolia	Anatolie du sud–est	Юго-Восточная Анатолия
h	2.41	Mediterranean coast	Côte méditerranéenne	Средиземноморское побережье
	(1968)	**United Kingdom**	**Royaume–Uni**	**Соединенное Королевство**
a	5.19	Scotland	Ecosse	Шотландия
b	3.34	North	Nord	Северная часть
c	4.80	Yorkshire and Humberside	Yorkshire et Humberside	Йоркшиц и Хамберсайд
d	6.76	North–West	Nord–Ouest	Северо-Западная часть
e	3.32	East Midlands	East Midlands	Восточная часть Центрального графства
f	5.08	West Midlands	West Midlands	Западная часть Центрального графства
g	1.64	East Anglia	East Anglia	Восточная Англия
h	17.23	South–East	Sud–est	Юго-Восточная часть
i	3.70	South–West	Sud–ouest	Юго-Западная часть
j	2.72	Wales	Pays de Galles	Уэльс
k	1.50	Northern Ireland	Irlande du Nord	Северная Ирландия
	(1968)	**USSR**	**URSS**	**СССР**
		Baltic region	Région de la Baltique	Прибалтийский район
a	1.30	Estonian SSR	RSS d'Estonie	Эстонская ССР
b	2.30	Latvian SSR	RSS de Lettonie	Латвийская ССР
c	3.06	Lithuanian SSR	RSS de Lithuanie	Литовская ССР
d	0.69	Kaliningrad province	Province de Kaliningrad	Калининградская область
e	8.82	Byelorussian region (Byelorussian SSR)	Région de la Biélorussie (RSS de Biélorussie)	Белорусский район (Белорусская ССР)
		Ukrainian SSR	Région de l'Ukraine	Украинская ССР
f	20.39	Southwest	Sud–ouest	Юго-Западный район
g	19.92	Donets–Dnieper	Donetz–Dniepr	Донецко-Приднепровский район
h	6.07	South	Sud	Южный район
i	3.48	Moldavia SSR (Moldavia SSR)	RSS de Moldavie (RSS de Moldavie)	Молдавская ССР
		RSFSR	RSSFR	Р С Ф С Р
j	11.86	Northwest	Nord–ouest	Северо-Западный район
k	26.76	Centre	Centre	Центральный район
l	8.29	Volgo–Vyatka	Volga–Viatka	Волго-Вятский район
m	7.95	Central Black-earth	Zone centrale des terres noires	Центрально-Черноземный район
n	18.00	Povolzhyian	Povoljié	Поволжский район
o	13.87	North Caucasus	Caucase du nord	Северо-Кавказский район
p	15.26	Ural	Oural	Уральский район
q	12.20	West Siberia	Sibérie occidentale	Западно-Сибирский район
r	7.32	East Siberia	Sibérie orientale	Восточно-Сибирский район
s	5.71	Far East	Extrême-orient	Дальневосточный район

Code Code Код	Population (millions) Population (millions) Население в млн.	Regions	Régions	Районы
		USSR (continued)	**URSS (suite)**	СССР (прдолжение)
		Transcaucasus region	Région de la Transcaucasie	Закавказский район
t	4.66	Georgian SSR	RSS de Géorgie	Грузинская ССР
u	4.92	Azerbaijan SSR	RSS d'Azerbaïdjan	Азербайджанская ССР
v	2.31	Armenian SSR	RSS d'Arménie	Армянская ССР
w	12.68	Kazakhstan region (Kazakhstan SSR)	Région du Kazakhstan (RSS du Kazakhstan)	Казахстанский район (Казахская ССР)
		Central Asian region	Région d'Asie centrale	Среднеазиатский район
x	11.27	Uzbekistan SSR	RSS d'Ouzbekistan	Узбекская ССР
y	2.84	Kirghizian SSR	RSS de Kirghizie	Киргизская ССР
z	2.03	Turkmenistan SSR	RSS du Turkmenistan	Туркменская ССР
α	2.74	Tadzhikistan SSR	RSS du Tadjikistan	Таджикская ССР
	(1968)	**Yugoslavia**	**Yougoslavie**	Югославия
a	1.69	Slovenia	Slovénie	Словения
b	4.36	Croatia	Croatie	Хорватия
c	3.80	Bosnia – Herzegovina	Bosnie–Herzégovine	Босния - Герцеговина
d	8.19	Serbia	Serbie	Сербия
e	0.54	Montenegro	Monténégro	Черногория
f	1.57	Macedonia	Macédoine	Македония

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Printed in Switzerland
2304 - November 1972 - 3,795
Reprinted in U. N., N. Y.
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